Forestry D.K.

DEC 18 1930

VETERINARY MEDICINE

January, 1931

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No. 1
VOL. XXVI

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Chicago, U. S. A.

A Merry Christmas

to all our friends everywhere . . . . .

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Forestry
Faxon

Veterinary Medicine

VOL. XXVI JANUARY, 1931 No. 1

Published Monthly by the Veterinary Magazine Corporation
75 East Wacker Drive, Chicago, Ill., U. S. A.
$4.00 a Year

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of Mar. 3, 1879.
Entered as second-class matter under the title of American Journal of Veterinary Medicine, July 19, 1910, at Chicago, Illinois, under Act of March 3, 1879.

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

It is stated that the very heavy losses from rinderpest in France, Germany and Italy were responsible for the establishment of the first veterinary schools in those countries.

In 1865 a shipment of cattle from Finland to London, introduced rinderpest into England. More than 500,000 cattle died during the outbreak that followed.

Although the *B. suipestifer* or *Salmonella suipestifer,* is most commonly found in diseased swine (Infectious enteritis) it is occasionally reported in human infections, usually in cases of food poisoning, but in a few cases of lung infection.

One hundred and seventy-two outbreaks of hog cholera occurred in Maryland in the first nine months of 1930. 266 outbreaks occurred for the same period in 1929. The eleven-year-average is 447 outbreaks of hog cholera in Maryland during the first nine months of the calendar year.

Sixteen counties in Iowa have 100% membership in the Iowa Veterinary Medical Association, and in 27 counties all but one of the veterinarians eligible for membership in the association, belong to it. Applications now pending will add 12 more counties to the number having 100% membership in the Association.

Stocker and feeder shipments of calves have increased enormously in recent years, and have tended to cause a more even flow of fed cattle to market throughout the year.

The way to keep quack remedies and quack practices out of your community, in the East at least, is to be able to give such superior service that quack remedies simply won't fit in.—J. F. DeVine.

A German writer has described a herd of cattle in which no new blood has been introduced for eighteen years. The individuals were vigorous, fertile and good milk producers. One individual had but seven different ancestors in five ancestral generations, and another had but five different ancestors in four ancestral generations.

Between 1% and 2% of the hogs received at public markets are shipped out again for further feeding. These stocker and feeder shipments of hogs are relatively unimportant as compared with shipments of cattle and sheep, nearly 19% of the cattle and 20% of the sheep received at public markets being shipped out again for feeding. Feeder shipments of hogs reach the lowest level of the year in July and the maximum movement in November.

Evidence that the objectionable potato flavor in cream and butter may be caused by bacteria as well as through absorption of potato odor by cream, was secured in studies and development of the control of flavors of cream at the Illinois Station.

What has commonly been referred to as brooder pneumonia in young chicks is in reality the lung form of pullorum disease (B. W. D.). Experiments at the Illinois Station during the past years support this announcement made during the preceding year.

Anemia in suckling pigs, as is well known, may be prevented by giving the pigs from birth small doses of iron and copper. A practical method for the administration of the iron and copper worked out at the Illinois Station consists in wetting the sow's udder two or three times daily with a dilute solution of iron sulphate and copper sulphate. This solution may be applied with a brush.

Roberts of the Illinois Station, after five years work, in which he used more than 6,000 baby chicks in genetic studies of the resistance to disease, concludes that some chicks definitely inherit a resistance to pullorum disease (B. W. D.), the worst of all poultry diseases.

In an experiment young chicks were artificially infected with the disease. There was a 67% survival among chicks from the selected resistant stock and only a 28% survival among control chicks.

Emmel of the Michigan Station has observed numerous cases of natural infection of domestic fowl with bacillus abortus and experimentally found chickens, turkeys, pigeons, ducks and geese susceptible to the infection.

Gilman and Brunette of the New York Station found these birds difficult to infect or wholly unsusceptible and natural infection occurring somewhat rarely.

Beach of Wisconsin Station found poultry immune to *B. abortus* and questions that natural infection occurs.

Carroll and others at the Illinois Station discovered that limestone is not a complete substitute for bone meal as a calcium supplement for swine. Their experiments indicate nevertheless that it is an efficient supplement.

Rock phosphate was shown to be distinctly toxic for swine, just as it was earlier shown to be toxic for cattle.

Jacobs of the Tennessee Station conducted an experiment to determine whether in the castration of ram lambs there was any advantage in the use of the knife and the open scrotum method, or in the use of the emasculatome and not opening the scrotum. There was no mortality in the experiment following either method, and no advantage in either in the rate of gain in the lambs.

Doctor Jacobs points out, however, that the danger of tetanus following the operation is lessened to some extent by the use of the emasculatome method.

Two opposing views have been held as to the manner in which trypanosomes injure the host, one group maintaining that the pathological changes are due to a toxin elaborated by the trypanosomes, while the others attribute the result to a depression of the glucose and glycogen reserves.

Geiger and Associates of the Hebrew University at Jerusalem found that the blood of trypanosome-infected rats contains an abnormal concentration of lactic acid which increases progressively with the development of the infection. These findings led to the assumption that the abnormal concentration of lactic acid in the blood led to a progressive depression of the alkali reserve, the process ultimately resulting in death from acidosis.

It is possible that a similar process goes on in malaria infection, and the strikingly favorable results obtained in the treatment of malaria with the administration of bicarbonate of sodium is highly suggestive.

Since nutritional anemia can be produced readily in pigs, rats and rabbits by keeping these animals housed and limiting their diet to one of milk, it was thought desirable to find out whether or not young chicks, a class of animals for which milk is not a natural food, would develop nutritional anemia if kept under similar conditions.

In an experiment at the Illinois Station chicks so reared became severely anemic by the time they were three or four weeks old.

Brucella organisms have been isolated from the blood stream of 48 patients in Iowa. In one case both the abortus and suis varieties were obtained from a single culture, thus giving us 49 strains. These have all been typed, including a number repeatedly isolated from the same patients. Our findings, confirmed by Huddleson, on all but a few of the more recently isolated strains, show 35 to be variety suis and 14 variety abortus.—A. V. Hardy, in *Public Health Reports,* Vol. 45, No. 41.

Feeding of Fowler's solution to animals intended for show purposes has long been practiced. Studies made by Roberts of the Illinois Station show this to be a dangerous practice when breeding stock is involved.

Results showed that the feeding of the solution not only lowers the fertility of both sexes, but injures the general health of the animal and increases mortality of the offspring. That animals that win in the show ring are frequently sterile or of low fertility is a well recognized fact.

Roberts suggests that the use of Fowler's solution may be the cause of the lack of fertility. The fertility of male rabbits was decreased 50% by the use of Fowler's solution and the mortality of the young at birth increased from 1.3% to 20% by the same means. The males showed no increase in fertility after the feeding of Fowler's solution was discontinued. The effect on females was similar.

The eradication of cattle ticks from McCurtain County, Oklahoma, is beginning to pay dividends in the form of improved live stock, according to a report by the U. S. Department of Agriculture. A recent meeting of cattlemen and public officials at Idabel revealed that 91 registered purebred bulls of beef type had been introduced into the county in the last two years. Cows bred to these bulls, speakers at the meeting declared, are producing calves of excellent quality. Most of the steer calves marketed graded high and it was estimated they brought 40% more than calves from the same cows when mated to scrub bulls. The cattlemen of McCurtain County have an organization which proposes to replace every scrub bull with a purebred.

The causative organism of fowl typhoid was first isolated by Klein in 1889, but the disease, as well as the organism, was later described under a variety of names. Although *Bact. gallinarum,* the cause of fowl typhoid, has many features in common with *Bact. pullorum,* the cause of bacillary white diarrhea (pullorum disease), the two remain as distinct species. Whereas *Bact. gallinarum* produces avid in maltose, dextrin and dulcite, *Bact. pullorum* fails to attack these. Furthermore, *Bact. pullorum* usually produces gas in some carbohydrate media, a feature never observed in the case of the typhoid organism.

Although fowl typhoid seems to attack adult birds by preference, it is occasionally seen in baby chicks. In this case the infection is undoubtedly contracted through the egg in many instances. This for the reason that the organism has been found to cause a localized infection in the ovaries of survivors of infection, in the yolk of the egg, and finally in the unabsorbed yolk of very young chicks dead of the disease. Outbreaks of the disease in chicks not exposed to any other known source of infection afford striking evidence of transmission through the egg. Beaudette, New Jersey, at the Inter. Vet. Cong.

Are Chickens Susceptible to Contagious Abortion?

By C. R. STRANGE and B. A. BEACH, Madison, Wisconsin

THE question of contagious abortion infection of poultry has received considerable attention of late, as have other classes of live stock. In 1929 Emmel and Huddleson[1] reported on 48 birds which they exposed to pure cultures, infected udder, aborted fetal calves, and infected milk both by feeding and intravenous injection. Some of these birds (they failed to state how many) showed clinical manifestations. An unstated number died. They assume that the abortion organism was responsible for the clinical manifestations, although apparently *B. abortus* was not recovered from any of these birds. It is not clear from this report that the birds were not suffering from something else. McNutt and Purwin[2] attempted to infect 103 chickens both by feeding and injection. These birds were kept for five months without evidencing symptoms. Some of them, however, reacted to the agglutination test.

As this goes to press, there comes the report of work of Gilman and Brunette.[3] They found reacting birds in several farm

Table I.

RESULTS OF FEEDING AND INJECTING BOVINE ABORTION CULTURES

Band No.	Method of Infection	Material Used	Date of Infection and Weight	Blood Reactions (RM—Rapid; LM—Long Method) Nov. 20 RM	Nov. 20 LM	Dec. 13 RM	Dec. 13 LM	Dec. 20 RM	Dec. 20 LM	Feb. 4 RM	Feb. 4 LM	Date Killed or died and weight	Lesions Shown	Guinea Pig Injected and Date	Date Killed	Blood Reaction of Guinea Pig	Remarks
7519	Fed	10 cc. bovine culture	Nov. 11 1400 g.	−	−	−	−	−	−	−	−	Killed Feb. 11 3155	None				
7761	Fed	"	Nov. 11 1225	−	−	−	−	−	−	−	−	Killed Mar. 1 1420	None				
6747	Fed	"	Nov. 11 1125	−	−	−	−	−	−	−	−	Died Feb. 10	None				
7729	Fed	"	Nov. 11 806	+	+	−	−	−	−	−	−	Died Jan. 18 680	Enteritis				Postmortem revealed coccidiosis
7731	Fed	"	Nov. 11 1000	+	+	+	+	−	−	−	−	Killed Mar. 10 1490	None				
7522	Subcutaneous	Bovine	Nov. 11 2255	+	+	P	P	−	−	+	+	Killed Feb. 11 2770	None	Feb. 11	June 19	−	−
7728	"	Bovine	Nov. 11 858	+	+	+	+	+	+	P	S	Killed Feb. 11 1775	None	Feb. 11	June 19	−	−
7727	"	Bovine	Nov. 11 1150	+	+	+	+	P	P	−	−	Killed Feb. 10 1435	None				
5162	Intravenous	Bovine	Nov. 11 2280	+	+	+	+	+	+	+	+	Killed Feb. 11 2840	None	Feb. 11	Died Feb. 14		
7523	"	Bovine	Nov. 11 2275	+	+	+	+	+	+	−	−	Killed Feb. 10	None				

Key: + = positive or complete agglutination; − = negative or no agglutination; P = partial agglutination; and S = slight agglutination.

[1] Emmel and Huddleson. *Jour. Amer. Vet. Med. Assn.*, 28-5, 1929.
[2] McNutt and Purwin. *Jour. Amer. Vet. Med. Assn.*, 30-2, 1930.
[3] Gilman and Brunette, *Cornell Veterinarian*, Vol. XX. No. 4.

flocks and were able to recover the organism. There was, however, no evidence of clinical disturbance, and neither were they able to produce clinical evidence of disease in those experimentally fed and infected. The organism was recovered from those experimental birds which were killed within a month after infection. In the work herein reported, we were unable to isolate the organism, probably for the reason suggested by Gilman and Brunette, that we waited too long after infection before slaughtering the birds.

Our Own Investigations

Thirty-two chickens were used in the experiments. They were between five and six months old. All were negative to the agglutination test. Cultures of both bovine and porcine origin, naturally infected milk from three different cows, an aborted fetal calf, and aborted fetal rabbits were used. The rabbit fetuses were from abortion-infected does.

Five cultures were used, two of which had been isolated within twelve months. The other three were stock laboratory cultures. Our findings are set forth in Table I.

Five of the ten chickens were fed pure cultures of bovine origin, 72-hour growth. The five cultures were washed from agar slants in 150cc of salt solution. 10cc of these pooled cultures was deposited in the crop by means of a rubber tube and funnel. Two of these chickens reacted to the agglutination test; one of them once, and the other twice. Four of the birds were killed at the conclusion of the experiment. Other than the one with coccidiosis, they were in perfect health throughout the experiment. Three chickens were injected subcutaneously and two intravenously. These chickens likewise remained in good health and re-

Table II.
RESULTS OF FEEDING AND INJECTING CHICKENS WITH PORCINE ABORTUS CULTURES

Band No.	Method of Infection	Material Used	Date of Infection and Weight	Blood Reactions (RM—Rapid; LM—Long Method)								Date Killed or died and weight	Lesions Shown	Guinea Pig Injected and Date	Date Killed	Blood Reaction of Guinea Pig		Remarks
				Nov. 20		Dec. 13		Dec. 20		Feb. 4								
				RM	LM	RM	LM	RM	LM	RM	LM							
7361	Fed	Porcine	Nov. 11 1825 g.	P	–	+	+	P	P	–	–	Killed Feb. 10 2055	None					
7788	Fed	"	Nov. 11 1025	–	–	–	–	–	–	–	–	Killed Feb. 11 1680	None					
7520	Fed	"	Nov. 11 2325	–	P	S	S	–	–	–	–	Killed Mar. 10 2470	None	Mar. 10	June 19	–	–	
6783	Fed	"	Nov. 11 1725	–	–	+	+	S	S	–	–	Killed Feb. 11 2560	None	Feb. 11	Died Apr. 24	–	–	This pig died of coccidiosis
5467	Fed	"	Nov. 11 950	–	–	+	+	+	+	+	+	Died Mar. 9 1185	Enteritis					Died of coccidiosis
5102	Subcutaneous	"	Nov. 11 1625	+	+	+	+	+	+	+	+	Killed Feb. 11 1690	None	Feb. 11	June 19	–	–	
4026	"	"	Nov. 11 1700	+	+	+	+	+	S	–	–	Killed Feb. 11 1910	None	Feb. 11	June 19	–	–	
6604	"	"	Nov. 11 1310	+	+	+	+	+	+	+	+	Killed Mar. 11 1835	None	Mar. 11	June 19	–	–	
5158	In vein	"	Nov. 11 2625	+	+	+	+	+	+	+	+	Killed Feb. 11 3420	None	Mar. 11	June 19	–	–	
7408	In vein	"	Nov. 11 2000	+	+	+	+	+	+	+	+	Killed Feb. 5 2200	None	Feb. 5	June 19	–	–	This bird injured comb Dec. 7, but recovered
7486	Control	.....	Nov. 11 1125	–	–	–	–	–	–	–	–	Killed Mar. 11 1720	None					

vealed no lesions on postmortem examination. All of these birds reacted to the agglutination test, although with one exception the serum titre was weak or entirely absent toward the end of the experiment.

(Guinea pigs were injected with tissues from three of these chickens, the three that reacted on the last test. An emulsion of spleen, liver and ovary or testicle was injected subcutaneously. The guinea pigs failed to reveal lesions and the serum was negative.)

In Table II are shown the chickens injected and fed with porcine cultures.

The results were much the same as with the bovine culture, except that the agglutination titre of the serum was higher. Postmortem examination was negative as was the guinea pig injection.

During the course of another experiment there became available some aborted rabbit fetuses. These does were injected with bovine cultures and cultural examination of the fetuses revealed the bovine organism.

The results of feeding three chickens with this material are set forth in Table III.

Two of these chickens reacted to the agglutination test. In neither instance, however, did the reaction persist.

In Table IV are shown the results of feeding naturally infected bovine milk to chickens. The milk of three cows was utilized. That the milk was infected was shown by guinea pig inoculation.

Three of the six chickens gave positive reactions to the agglutination test at some time; two others gave a partial reaction. The postmortem findings and guinea pig injections were negative.

One chicken was fed the stomach con-

Tables III and IV.

RESULTS OF FEEDING ABORTED RABBIT FETUSES AND NATURALLY INFECTED MILK

Band No.	Method of Infection	Material Used	Date of Infection and Weight	Blood Reactions (RM—Rapid; LM—Long Method)								Date Killed or died and weight	Lesions Shown	Guinea Pig Injected and Date	Date Killed	Blood Reaction of Guinea Pig	Remarks
				Nov. 20		Dec. 13		Dec. 20		Feb. 4							
				RM	LM	RM	LM	RM	LM	RM	LM						
7021	Fed	Aborted Rabbit Fetus	Nov. 20 1250 g.			+	+					Killed Dec. 19 1070 g.	Omental abscesses	Dec. 19	Mar. 11	–	Acid fasts found in omental abscesses
463	Fed	"	Nov. 20 1450			+	+	S	S	–	–	Killed Mar. 11 2115	None				
5838	Fed	"	Nov. 27 1350									Killed Dec. 9	Liver congested Enteritis				Hen killed because of diarrhea. Many coccidia
6159	Fed	Milk from Inf. Cow	Nov. 23 1150			+	+	S	S	–	–	Killed Feb. 21 1775	None				Fed twice 4 days apart 60 cc.
6777	Fed	"	Nov. 23 and 27 1300			+	+	P	+	P	+	Killed Feb. 25 1830	None	Feb. 21	June 19	–	Fed twice 4 days apart 60 cc.
425	Fed	"	Nov. 23 and 27 1350			–	–	–	–	+	+	Killed Mar. 21 2060	None	Mar. 21	Died May 3	–	Cause of death not determined
6732	Fed	"	Nov. 23 and 27 1150			–	–	–	–	–	–	Killed Feb. 21 1300	None				
6799	Fed	"	Nov. 23 and 27 1375			P	P	–	–	–	–	Killed Feb. 21 2060	None				
441	Fed	"	Nov. 23 and 27 1551			–	–	–	–	P	S	Killed Feb. 21	None	Feb. 21	June 19	–	

tents of an aborted fetal calf. This chicken did not react, and postmortem was negative.

Discussion

The abortion organism failed to cause clinical evidence of disease in 32 chickens. They were allowed to live between three and four months. The gain in weight was satisfactory in most instances. It apparently made no difference as to the manner of administration; except that subcutaneous and intravenous injection caused more of them to react to the agglutination test. Bacteriological examination of the chickens at the time of slaughter failed to reveal abortion organisms. The spleen, liver, and testicle or ovary were cultured. Guinea pig injection of this material also gave negative results. Whether the organisms were not present or were in some organ other than those examined we do not know. It is evident that chickens are not ordinarily susceptible to abortion infection. That they may be susceptible at times under field conditions is an open question.

GENERALIZED MALIGNANT TUMOR

A cow that showed proturberant eyeballs similar to exopthalmic goitre in the human was bought by one of the packers subject to postmortem inspection. The animal was blind or nearly so. There were no lesions or but slight lesions of the eyeballs themselves, the new growth appearing in the tissues behind the eyes.

On postmortem examination, no lesions in the lymph glands of the cervical region were found, nor anything particularly noticeable in the carcass. There were numerous lesions from the size of a walnut to about four inches in diameter scattered through the entire mesenteric region, around the sacral cavity and in the abdominal walls. There were some smaller lesions of the same type in the thoracic cavity. The carcass was rather thin but not near emaciation.

Such cases are frequently found in old cows or those over six years old, and usually where only in fair flesh. In this class of cases there are rarely any lesions of the lymph glands that are noticeable in the gross examination of the organs. Consequently the cases are rarely tagged on antemortem examination unless the animal appears debilitated or sick.

W. Ross Cooper.

Kansas City, Mo.

CANNED SALMON AN EFFECTIVE BLACKTONGUE PREVENTIVE

In many of the smaller and more isolated industrial communities, as well as in much of the rural area of the South in which pellagra is endemic, the fresh-meat supply is often very restricted, especially in the spring and summer months. During this period fresh meat is, to a varying degree, replaced by preserved meats of some sort, often including fish. Among the preserved fish, canned salmon appears to be quite generally used. This observation led the U. S. Public Health Service to a test of its blacktongue-preventive action in the dog, resulting in full protection against this condition.

As the study in the dog showed clearly that canned salmon has a decided preventive value in blacktongue, and, in view of the abundant evidence that canine blacktongue is the analogue of human pellagra, a comparable study of the value of canned salmon in pellagra was organized.

The fact that none of the group showed symptoms even suggestive of pellagra would seem to be convincing evidence of the pellagra-preventive action of the salmon and of the presence of the pellagra-preventive factor in canned Alaska chum salmon.

The demonstration that salmon contains the pellagra-preventive factor is of considerable interest. In the first place it is a readily available preserved food, comparatively cheap, and, if used in sufficient quantity, constitutes a dependable substitute for fresh meat, at least in so far as the pellagra-preventive factor is concerned. The results furnish additional evidence that blacktongue in dogs is the analogue of pellagra in man.

The Physiology Of Egg Production

By E. A. HEWITT, Ames, Iowa
Department of Veterinary Physiology, Iowa State College

THE diseases of poultry have stimulated great interest among the veterinary practitioners and their knowledge of these diseases has been enhanced by investigations in poultry pathology carried on at the various experiment stations. However, little attention has been paid to the normal physiological processes of poultry. For this reason it was thought that a resume of the known physiology of egg production would be timely.

The direct economic importance of poultry lies in the production of two things, namely, meat and eggs. Under natural conditions in the wild state, the ancestors of the domestic fowl produced relatively few eggs. However, it is highly probable that the wild progenitors, of our domestic poultry, possessed the potential ability to lay far more than the usual number of eggs. Under domestication the practice of removing the eggs as fast as laid, and also the practice of increasing the length of a working day by the use of artificial light, together with intensive feeding, the physiological function of egg production has been very highly developed.

The reproductive organs of female birds, and especially the domestic hen, are among the most complicated. They function, not only to produce the ovum, but also to provide a protective envelope for protection and nourishment for the embryo when growth subsequently takes place. As the ovum develops after it is outside of the body of the parent, this elaborate protection is necessary in order to preserve it in its original form, to retard evaporation of water, and at the same time to permit the absorption of oxygen and moisture.

The female generative organs consist of a single ovary and an oviduct, which is situated in the left sublumbar region of the abdominal cavity adjacent to the backbone and just at the anterior extremity of the kidneys.

The reproductive organs are paired in the embryo, but the right ovary and oviduct usually fail to develop. Occasionally a rudimentary right oviduct is present. Gallagher[1] observed in an active laying hen, a right oviduct which was nearly as long as the left oviduct and equally voluminous. Its anterior extremity exhibited an infundibular membrane in contact with the ovary. Posteriorly it opened into the cloaca opposite the left oviduct. The appearance of its mucus membrane suggested that it was capable of functioning.

According to Kaupp[2] the ovary contains from 3,500-4,500 germ cells called oöcytes in various stages of development from microscopic granules to fully formed yolks in functioning ovaries. All the oöcytes that the ovary is capable of producing are present in the ovary at the time that the chick is hatched.

In the pullet the ovarian mass appears somewhat like a bunch of grapes. The oöcytes are small whitish spheres which represent the undeveloped ova, and which in the active state are developed one by one into yolks with their blastoderms. From the blastoderm the fetus or baby chick may later be developed. In the active ovary of the laying hen the ovarian mass is of considerable size, as it contains ova in different stages of development. Only one ovum is completely developed at a time, though occasionally there may be only a few hours between the maturity of successive ova. The ova receive nourishment from blood vessels of the capsule, which vessels are branches of the ovarian artery.

The ovary contains a very vascular cellulo-fibrous tissue. The ovum as it develops

[1] Ward & Gallagher—Diseases of Domesticated Birds—MacMillan & Co., New York, 1220.
[2] Kaupp—Anatomy of the Domestic Fowl—W. B. Saunders 1918—p. 178.

is enclosed in a fibrous capsule or follicle which is attached to the ovarian body by means of a delicate white fibrous pedicle. When the yolk is mature it escapes from the enveloping fibrous capsule by a cleavage of the capsule. The cleavage line is called the stigma. The yolk is surrounded by a very delicate membrane called the vitelline membrane. The empty sac or follicle then shrinks and finally disappears.

The oviduct of the hen is a large tube, whitish in color, which starts at a point just below the ovary and ends at the cloaca. The oviduct is tortuous in its course, forming three principal convolutions before reaching the cloaca. The active organ becomes very much enlarged pushing the abdominal viscera downward and to the right side. It is covered with a fine network of blood vessels.

The wall of the oviduct consists of three layers, the outer, a serous coat, which is a reflection of the peritoneum, the middle, a coat made up chiefly of smooth muscle and connective tissue and consisting of an outer longitudinal and an inner circular layer of muscle; and the inner layer, a mucous membrane which in the resting state is thrown into folds.

The oviduct is held in position by two ligaments, one dorsal and one ventral. The dorsal ligament of the oviduct is formed by a double layer of peritoneum with a small amount of connective tissue and muscle fibers, which become continuous with the circular muscle fibers of the oviduct. The peritoneum is reflected over the oviduct and forms the external or serous coat. The dorsal ligament maintains a line of attachment to the body walls from the caudal end of the body cavity to the fourth thoracic vertebra. The ventral ligament of the oviduct of the laying hen is largely a muscular cord 3 to 6 centimeters in diameter and has a free ventral border. The muscular tissue of the ventral ligament is also continuous with the circular fibers of the oviduct. Miss Curtis[3] observed that there is a great disproportion between the amount of musculature in the walls of the oviduct, except in the uterus and vagina, and the degree of physiological activity of the organ. It seems possible that the muscle within the ligaments especially abundant at the caudal end of the ventral ligament may assist in the movement of the egg along the duct.

The oviduct is divided into five main divisions, which may be distinguished by gross observation, they are the infundibulum, the albumin secreting portion, the isthmus, the uterus where the shell is formed and the vagina.

The beginning of the oviduct consists of a funnel-shaped or trumpet-shaped portion, the *ostium tubae abdominale,* whose mouth or fimbriated opening faces the ovary, and lies ventrally to receive the ovum or yolk, as it is discharged from the ovary. Its thin walls, expanded in the anterior portion, are provided with fimbriate like projections. When the ovum is about to be discharged from the ovary these funnel lips or margins envelope that portion of the ovary so that the ovum may certainly pass into the oviduct and not into the abdominal cavity. The funnel-shaped portion soon converges to form a constricted portion. This portion of the active oviduct is from three to four centimeters in length.

The second division of the oviduct is the albumin secreting portion. The funnel-shaped division gradually merges into the second portion. The walls of the albumin secreting portion are much thicker and the longitudinal ridges are much higher. This section is the longest of the five divisions measuring from 40 to 42 centimeters in length or more than half the length of the oviduct.

The third section is the isthmus. The albumin secreting division terminates quite abruptly into the isthmus.

The fourth division of the oviduct is the uterus or shell gland portion. There is no clear line of demarcation between the isthmus and uterus, the walls gradually expanding.

[3] Curtis, M. R.—The Ligaments of the Oviduct of the Domestic Fowl.—Me. Agr. Exp. Sta. Bul. 167—1910.

The fifth division of the oviduct is the vagina. There is located at the junction of the shell gland portion with the vagina, a strong sphincter muscle. The vagina is that constricted portion of the oviduct extending from this muscle to the cloaca. The vagina in a hen of average size measures from 12 to 14 centimeters in length.

The mucous membrane constitutes the most important part of the oviduct, since it is from the glands therein that the albumin, shell membranes and shell are derived.

Examined with the naked eye the mucous membrane is seen to be thrown into longitudinal and slightly spiral folds, on the sides of which are secondary folds. These folds are highest in the albumin-secreting part. In the uterus the folds become leaf like and of considerable length, extending into the lumen, thus affording greater cellular surface. In the vagina the mucous membrane forms low narrow folds, with secondary folds which appear continuous with those of the shell gland portion.

The epithelial layer or free surface of the mucous membrane is made up of glandular cells which are of two kinds. Ciliated columnar cells are intermixed with goblet cells in about equal proportion. In the first part of the infundibulum goblet cells are apparently absent, this region being lined by ciliated cells only. The bulk of the thickness of the mucous membrane is composed of glands. Surface[4] describes three types of glands: (1) Unicellular epithelial glands occurring between the ciliated cells in all parts of the oviduct except the anterior portion of the funnel; (2) Glandular grooves. These are accumulations of gland cells at the bottom of the grooves between the secondary folds of the epithelium. These are found only in the funnel region. But there they occur well towards the anterior end. (3) In all parts of the oviduct between the funnel and the vagina there is a thick layer of glands formed by indipping the epithelium, these are called tubular glands. They consist of long convoluted and branched tubules which open to the lumen of the oviduct by short epithelial ducts. These glands are the same in structure as the glandular grooves of the funnel portion. The tubular glands reach their greatest development in the albumin secreting region.

Histologically the unicellular epithelial glands present a similar appearance in all parts of the oviduct except the vagina. In this latter region the cells are longer and much narrower and have a slightly different arrangement than in other parts of the oviduct. The unicellular gland cells are more numerous at the mouths of the ducts leading from the tubular glands. The nuclei of these cells are round.

The walls of the tubular glands consist of large gland cells which in the albumin portion and the isthmus of the oviduct in a laying hen have small irregularly shaped dark staining nuclei which lie well towards the basal ends of the cells. In these two regions the protoplasm of the cells contains rather coarse granules which vary greatly in size.

The line of demarcation between the albumin secreting region and the isthmus is characterized by the absence of the tubular glands in that region. The cells of the tubular glands in the albumin region and in the isthmus present the same histological appearance.

In the uterus the cells which form the tubular glands have a slightly different appearance. The nuclei of these cells are large with regular outlines and are situated near the center of the cells. The protoplasm of the cells contain fine granules in place of the coarse granules in the cellular protoplasm of the tubular glands of the other regions.

The tubular glands or any homologous structures are entirely absent from the vagina. Only the unicellular epithelial glands occur here.

[This is the first of a series of three articles by Doctor Hewitt on the physiology of egg production. The second article will appear in an early issue of VETERINARY MEDICINE.]

[4] Surface, F. M.—The Histology of the Oviduct of the Domestic Hen.

Uses for Poisonous Plants

By L. H. PAMMEL, Ames, Iowa

I SUPPOSE that every veterinarian and physician knows something about the so-called fish-poison plants. One of the most conspicuous of these is the common mullein with which our ancestors used to catch fish by drying the leaves and tossing them into the water. The hairs on the leaves would get into the gills of the fish and they would come to the surface.

I have just looked over some interesting matter by F. N. Howes, and published by the Royal Botanic Gardens, Kew, England.[1] This extensive paper reviews at considerable length the various fish poison plants found in different parts of the world. Nearly all primitive people have from time to time made use of these plants for poisoning or stupifying fish in order to facilitate their capture.

This interesting statement is made by Mr. Howes: "With the advance and spread of civilization this method of fishing, condemned on account of the wholesale destruction of fish of all sizes which is involved, has naturally declined, and in some areas, particularly where the practice has been made illegal, it has fallen into disuse. In most areas the plants used are collected in the wild state, but there are reasons for supposing that among certain aborigines, particularly in South America and Tropical Africa, the plant or plants used have been cultivated by them for this purpose throughout the ages.

"There is little doubt but that many of these plants are of potential economic value and may in time be put to more profitable use than fish poisoning. The practical utility of some, notably species of Derris, has already been demonstrated in the commercial manufacture of efficient contact insecticides. There are now good reasons for believing that others, especially species of Tephrosia and Lonchocarpus, could be used equally well for insecticidal purposes if material of the plants were available in sufficient quantity. The number of plants used to any extent as insecticides at the present time is small and comprises probably only tobacco, pyrethrum, derris and hellebore. Apart from toxicity to insects other factors have to be borne in mind when considering the possible use of plants as insecticides. One of the most important of these is whether material is likely to be available in quantity, i. e., whether the plant is comparatively quick growing and easy of cultivation, for it is seldom that wild sources can be relied upon for any length of time. Various technical problems have to be confronted in the actual preparation of the extracts. Among these are the securing of efficient spreading, wetting, and adherence when actually applied.

"Apart from use as insecticides the possibility exists, in view of the diverse natures of these plants, that the active principles peculiar to certain of them may prove of further use in pharmacognosy and toxicology.

"The fact that certain of the fresh water snails, known to be hosts of, and the essential for the complete life cycle of, the organism responsible for schistosomiasis or bilharzia in man, are sensitive to the influence of fish-poisonous species of Tephrosia, suggests the possibility of such plants being of use in those areas where the incidence of the disease is high."

The part that snails play in distomiasis and "braxy" in sheep and in fluke disease in calves is suggestive of uses for fish-poison plants.

"The method of using these plants for procuring fish varies a great deal in different countries and is dependent also on the degree of virulence of the plant.

[1] Bulletin of Miscellaneous Information, Kew Gardens, No. 4, 1930. P. 129-130, 131.

All parts of the plant may be used, but in most cases a certain part only, such as the bark or root, in which the toxic principle happens to be chiefly located, is utilized. The usual method is for the plant or parts of the plant, after being mashed between stones or finely broken up, to be thrown into a pool or netted-off section of the stream. The poison acts on the respiratory organs of the fish, producing first a stupefying effect and later death, in the event of escape from the infected water being impossible. There are instances where an extract is mixed with some form of bait and is taken by the fish in the form of food. This custom is, however, far less common than the former method. In cases where the poisoning of the water is practiced there appears to be a considerable difference with different plants in the time required for stupefaction or death of the fish to occur. With some of the more active forms such as Malayan 'tuba' root (Derris spp.) and species of Tephrosia, fish are affected almost immediately, whereas with others several hours may elapse before the fish rise to the surface. A very slow action is characteristic of some of the plants used by the Australian aborigines in obtaining fish from water holes; the cut branches and leaves are left in the water holes from twenty to twenty-four hours before poisoning takes place. With plants of this sort the toxic effect on fish is considered to be due to the presence of tannins or saponins rather than to any glucoside or alkaloid. The injurious effect of tannic acid on fish, acting on the respiratory organs, has long been known. However, with most of the better known fish-poison plants their deleterious action has been proved definitely to be due to the presence of alkaloidal substances."

The feeding of bone meal according to the findings at the Texas Experiment Station has consistently decreased the habit of bone chewing and when the bone meal has been fed to cows, the calves have shown a consistent increase in weight.

BRUCELLA ABORTUS NOT TO BLAME FOR ERYTHEMA

Answering the question of G. T. S., Pennsylvania, on Page 542 of the December issue of VETERINARY MEDICINE, I used to have chapped hands in winter and thought it was from using disinfectants, and it was. Coal tar products caused it, and so will bichloride solutions.

Since I have been using a hypochlorite of sodium solution in cattle work, I have no chapped hands. If this is worth anything to G. T. S., I shall be grateful.—V. S. Huffman, Columbia City, Ind.

BRUCELLA ABORTUS BLAMED

The item on page 497 of the December issue of VETERINARY MEDICINE concerning an erythema of the arms after obstetric operations interests me. Is there any preventive? I am subject to this very annoying condition after obstetrical work and would appreciate greatly a means of preventing it. I think the rash is not due solely to the effects of disinfectants since I am troubled only after obstetrical work and in warm weather and cold alike.—H. V., Iowa.

RUPTURE OF THE UTERUS; RECOVERY

Recently I treated a case of antepartum rupture of the uterus in a five-year-old Holstein cow, with escape of a 140-pound fetus together with the fetal membranes into the abdominal cavity. This case was diagnosed without very much difficulty as the front feet of the fetus could be palpated quite distinctly at the caudal fold. A rectal examination revealed an empty uterus about the size of a football.

A laparotomy was performed and a tear of about fourteen inches in length situated on the dorso-lateral aspect of the fundus was sutured, with considerable difficulty, and the operation completed in the usual manner.

This animal made a good but rather slow recovery, and is now carrying another calf.—H. H. Hodgson, Stamford Centre, Ont.

Some Observations On Equine Practice

By H. J. MAGENS, Fredericksburg, Texas

IF ONE will but take the time, once in a while, to check over one's records, that is if one is not engaged in any one of the veterinary specialties, such as meat and milk inspection, exclusive small animal practice, etc., one will be very much surprised to find how much equine practice is still done. Somehow equine work in our country pays better than other practice, and it offers fine opportunities to show the advantages of real veterinary service over the service of empirics who for some reason seem to be especially active in this particular field of veterinary endeavor.

In spite of all that may be heard to the contrary, equine practice at least out here, is not at all a thing of the past; but, as my books show, is increasing. And there are reasons. Polo out here has given a decided impetus to breeding good mares to government stallions and we all know who have done our bit during the Big Show, when more horses were assembled than ever before in the world's history, how many accidents and troubles are directly due to shipping, handling, due to changes of feed, environments, etc. The work with the colder blooded, heavier type animals on the farms and ranches is also on the increase, here at least.

The leftovers from the war are gradually passing out. They have to be replaced. The demand for real good stock is increasing and who is in a better position to aid this movement than the local veterinarian who sees very many people and who knows working conditions and requirements for the different sections. I believe this to be a fine opportunity and that there is no reason whatever to be discouraged over the future of equine practice.

All those who are interested in military work will get their "refresher courses" as the army people call them at the yearly Reserve Officer Camps or National Guard Camps with combat organizations where the horse still plays, and I think always will play, an important part; where horsemanship is encouraged by riding exercises, by point to point rides at night, by horse-shows, etc.

In the following, some of my troubles are aired, maybe someone else can help by giving his experiences.

Doctor Baker's[1] eloquent article in VETERINARY MEDICINE, recalls vividly some fatal cases I have had in treating some impaction-colics due to feeding peanut hay. No one who has ever watched the dust, sand and other foreign articles being pressed into the bales of this hay at the threshing time will be surprised to see animals fed upon it, contract severe cases of enteritis, impaction colics, auto-intoxication due to intestinal stasis, and of fermentation colic.

Given a season when there is little moisture at harvest time and the conditions are still worse due to the enormous quantities of sand contained in the bales and ingested more or less hastily by the animals. If there is rain at harvest time then one will find that the mildewed portions of the bales will emit a strong stale odor and that the dust coming from them will cause the animals to cough continuously.

In short, peanut hay is a very undesirable feed for mules and horses. Baker's observation that one man can feed pea-straw hay *ad infinitum* without any mishaps, while his neighbor will have a continuous loss of animals holds true for peanut hay as well. This makes matters still harder for the attending veterinarian. Exciting causes such as sudden changes of weather, long hard periods of work after considerable time of range and pasture grazing, overheating, etc., seem always to enter into the picture. The mortality rate depends upon the time treatment begins after the first symptoms have been noticed. Delay in instituting treatment is responsible for the loss of most animals that succumb to these

[1] Baker, E. T.; Pea-Straw Impaction in Horses, VETERINARY MEDICINE, Vol. XXV, No. 2, February, 1930.

attacks. They often are just left "maybe they will be better in the morning" is the owner's common version, to shift for themselves for a day or so and it is such cases that are beyond redemption.

In all cases of peanut-hay impaction or other digestive ailments, a very guarded prognosis is in order even if the animals seem to improve at first. If carefully planned treatments of the simplest kind will not cause a decided change to the better in

A Case of Tetanus

a few hours, all other treatment is just waste of time, effort and money. Our fatal cases here in this section generally will pass out during the second twenty-four hours, the duration of time necessary to improve is from two days to two weeks depending upon the severity of the attack, the age and the condition of the animal and as stated before, the time treatment is initiated. In some instances, a severe diarrhea will be present, but in most cases, stubborn impaction of the colon are the rule, accompanied by all the familiar symptoms of that trouble.

There are always three things to consider in making one's decisions according to D. Wirth[2]: First make yourself as accurate a picture of the severity of the case under treatment as possible, considering all aspects; second, judge always general condition including pulse, respirations, mucous membranes, temperature and peristalsis; third, make rectal exploration.

As to the first, the general behavior of the animal will give one at once an idea as to the severity of the case. Colics of the same exciting causes, says the same author, are almost always of very similar clinical symptoms and findings, although the degree of this exciting factor, i.e., the amount of the offending ingesta retained, the length of intestine involved in changed positions, the degree of torsion and incarceration will influence the length of the attack and the severity to some extent. Increased peristalsis is an indication of tympanites and in some instances of volvulus or torsion of some intestinal segment. In most impactions rectal exploration will give an idea as to the location of the impaction, although in certain cases rectal examinations will be negative. It is impossible to give a definite line of treatment for these cases, each has to be handled upon its own merits entirely.

With regard to treatment, I would refer again to Doctor Baker's article and the contemporary literature, they are very much like my own observations.

Autopsies are indicated in all cases where one can get the time to make them. In these peanut-hay impactions they reveal large masses of ingesta which are often so hard that in several instances I have used an ax to cleave them apart. This never fails to make a wonderful impression upon the owner. After such a demonstration, one will usually be called earlier in the next case.

Another great field of the empiric is castration. It too offers chances for the practicing veterinarian, especially if one is lucky enough to have in one's immediate vicinity an empiric practicing who has a run of tetanus in his wake. There were several in my locality this year. They all made work for me and what is best promise for more in the immediate future and in the following years.

Azoturia came in for its share of calls last winter. I have had the best results with lobeline sulphate injections and chloral hydrate accompanied by strong diurectics.

Injuries, wire cuts, lameness of the many types make up the equine work not to forget infectious influenza with its many sequelae. It pays to be familiar with equine work even though it is not any more the main part of practice for many of us.

[2] Stange-Wirth; Vol. 6, page 705; 1929, *Tierheilkunde und Tierzucht.*

The Value of Calcium Gluconate in Milk Fever*

By E. C. BOVETT, M.R.C.V.S., Glastonbury, and L. W. BOVETT, M.R.C.V.S., Bridgewater, England.

Since September of last year we have used nothing but calcium gluconate (Sandoz), as advised by Prof. Greig, in cases of milk fever, with the exception of one (the last reported here) when calcium was not immediately available. The results have been uniformly satisfactory, and in our opinion it is a specific, most cases responding to, and being cured by, one injection, and probably all would have been had the first dose been sufficiently large, as a second injection has never failed to effect a complete cure.

We are so pleased with this more rational method of treating the disease that we are publishing our results in the hope that they may be of interest to, and give confidence in its use to, other practitioners, and also encourage Prof. Greig to carry on with his good work and tell us how many more diseases are due to deficiencies.

Case No. 1.—*Light I.*—January 19th: 10 a.m. Attacked with milk fever. 1 p.m. Cow down, but was got on to her feet with difficulty. Markedly staggery. Injected 2 ozs. calcium in 1 pint water. 6 p.m. On her feet and perfectly normal. Recovery uneventful.

Case No. 2.—*Light II.*—January 20th: Attacked with milk fever of mild type. Injected 2 ozs. calcium in 1 pint water. Recovery uneventful.

Case No. 3.—*Champion.*—January 24th: Paddling hind legs; fell down; soon unable to rise; head retracted to side. Injected 3 ozs. calcium in 2 pints water. One and a half hours later was normal in herself, but unable to rise. Twelve hours later on her feet. Recovery uneventful.

Case No. 4.—*Bell.*—February 7th: 4 p.m. Cow down. Seen at 6:30 p.m. Unconscious, head retracted to side. 3 ozs. calcium in 1½ pints water, given by gravitation subcutaneously. 9 p.m. Cow up and feeding but unsteady. Recovery uneventful.

Case No. 5.—*Maunder.*—February 11th: Cow found down in the morning. Seen 10:30 a.m. Quite unable to rise and partly insensible, but still able to sit up. Head retracted. Injected 2 ozs. calcium in 1 pint water. Recovery uneventful.

Case No. 6.—February 28th: 4 p.m. Cow down. 6:30 p.m. Quite unconscious and snoring. Injected 4 ozs. calcium. 9:30 p.m. Cow on her feet, and apparently normal. Recovery uneventful.

Case No. 7.—Cow had been attacked for several hours. 7 a.m. Injected 4 ozs. calcium given subcutaneously in the neck by gravitation. 11 a.m. Cow on her feet and apparently normal. Recovery uneventful.

Case No. 8.—*Cotton I.*—March 9th: Cow found down in the morning. 9:30 a.m. Given 2 ozs. calcium in 1 pint water subcutaneously by gravitation. 12 noon. Cow on her feet. Recovery uneventful.

Case No. 9.—*Cotton II.*—March 10th: Cow found down in the morning. 7:30 a.m. Unconscious. Head retracted to side. 3 ozs. calcium in 1½ pints water injected. 10 a.m. Cow on her feet. Recovery uneventful.

Case No. 10.—*Lumber.*—March 11th: 8 a.m. Cow down. 10 a.m. Injected 2 ozs. calcium in 1 pint water. Quite unable to rise, but resting naturally. 1 p.m. Cow on her feet. Recovery uneventful.

Case No. 11.—*Millard.*—April 3rd: Cow found down in the morning, but not seen until 4 p.m. Then found unconscious lying on her side. Injected 4 ozs. calcium in 2 pints water. 8 p.m. Cow on her feet. Recovery uneventful.

Case No. 12.—*Frampton.*—April 18th: Cow down, unable to rise, lying flat on side, but sudden movement caused general spasticity. Injected 3 ozs. calcium in 1½ pints water, and propped up as well as the stiff

legs allowed. Two hours later cow on feet. Recovery uneventful.

Case No. 13.—*James.*—April 25th: 8 p.m. Cow down. Seen 10 p.m. Unable to rise but sitting up. Injected 2 ozs. calcium in 1 pint water. Up in the morning. Recovery uneventful.

Case No. 14.—*Cotton III.*—April 22nd: 10 a.m. Cow down. Seen 11:30 a.m.; still able to sit up. Injected 2 ozs. calcium in 1 pint water. 1 p.m. Cow on her feet. Recovery uneventful.

Case No. 15.—*Nurse.*—May 8th: 6 p.m. Cow down. 6:30 p.m. Injected 2 ozs. calcium in 1 pint water. 8 p.m. Cow on her feet, and quite steady on legs. Contrary to instructions, she was milked dry that evening and again in the morning, but was normal when seen at 9:30 a.m. 12:30 p.m. Again staggering and walking with stiff hocks. 5 p.m. Cow again down. 8 p.m. Quite unconscious, lying flat on side and snoring. Propped up. Injected 4 ozs. calcium in 2 pints water. 12 midnight. Was chewing her cud and was left. When seen at 6 a.m. was up and steady. Recovery uneventful.

Case No. 16.—*Coate.*—May 8th: 11:30 p.m. Cow staggering. Injected 2 ozs. calcium in 1 pint water. Steady in half an hour. Recovery uneventful.

Case No. 17.—*Gooden.*—May 8th: 3 p.m. Cow down. Unable to rise, but sitting up. Injected 2 ozs. calcium in 1 pint water. 5:30 p.m. Cow on her feet. Recovery uneventful. Cow gave 2 gallons of milk beside the calf next morning. We have treated this cow four times previously by inflation.

Case No. 18.—February 3rd: 5 a.m. Cow down. Quite comatose and snoring. Injected 2 ozs. calcium in 1 pint water. 11 a.m. Cow on her feet. Recovery rapid.

Case No. 19.—February 18th: 11 a.m. Cow down. Injected 2 ozs. calcium in 1 pint of water. She was chewing her cud in three-quarters of an hour. 1 p.m. Cow on her feet. Recovery rapid and uneventful.

Case No. 20.—March 11th: 5 p.m. Cow showed incoordination of movements and soon went down. Injected 2 ozs. calcium in 1 pint water. 8:30. Cow up and feeding. Recovery uneventful.

Case No. 21.—March 18th: 5:30 p.m. Cow down and semi-conscious. Injected 2 ozs. calcium in 1 pint water. 10:30 p.m. Cow better, but not up, so the dose was repeated, and cow got up at 11:15 p.m., and thereafter recovery was uneventful. (We think she would have got up all right without a second dose, but, owing to the lateness of the hour, the dose was repeated.)

Case No. 22.—April 8th: 10 a.m. Cow down and comatose. Injected 2 ozs. of calcium in 1 pint of water. 2 p.m. Cow on her feet, and quite well when one of us saw her at 6 p.m. Next day she was down again, but feeding, chewing cud, etc. At 5 p.m. another injection given. 6:30 p.m. Cow up. Recovery uneventful.

Case No. 23.—May 11th: 6 p.m. Cow down. Saw her at 6:30 p.m. and got her up, but she staggered and showed all the signs of commencing milk fever. Injected 2 ozs. calcium in 1 pint of water, and cow did not go down again. 7 p.m. Cow feeding. Recovery uneventful.

Trollope (treated by udder inflation only).—May 7th: 2:30 a.m. Cow down. Had been attacked for two hours. Insensible, but struggling violently. Owing to a wrong diagnosis by the owner, calcium was not taken but the udder was inflated very hard with an enema pump. Cow did not appear much better until 12:30 p.m., but was up at 1:30 p.m. Since then she has gone on all right, but is now (May 17th) giving only 2 gallons of milk a day instead of 5 gallons, as she did before she was attacked.

This case is mentioned as a contrast to the other cases described above, in so far that, in the case treated by calcium, the milking quality of the cow remained unaffected.

Discussion and Summary

It will be seen that the above 23 cases all showed specific response to calcium gluconate, and were rapidly and completely cured.

In our opinion, the calcium method is infinitely better than inflation as it is safer,

quicker, cleaner and easier in application. This method is very popular with owners, too, as it does not interfere with the milking of the cow afterwards, nor have they to keep the calf muzzled or away from the cow.

My usual procedure is to inject subcutaneously by gravitation the whole quantity of the calcium solution at one point, but in the case of a tight-skinned animal I use three or four points of injection. I can inject a quart in this way in five to eight minutes.—*Veterinary Record*, Vol. X, No.29.

MILK FEVER RECURS IN SEVEN WEEKS

May 11, 1930, I was called to see a pure-bred Guernsey heifer that had freshened three months previously and had been rebred. This animal was showing all symptoms of milk fever, in fact was unconscious. This was at 10 A. M., at which time I gave 250cc of a 10% solution of calcium gluconate intravenously.

In twenty minutes she had regained consciousness, but did not get up until 5 P. M.

Again on July 2, 1930, I was called to see this same animal. She was exhibiting symptoms of milk fever but was yet on her feet. This time I gave five drams of calcium chloride in six ounces of distilled water, with recovery in about thirty minutes.

Have you anything to offer in regard to the care of this animal to prevent further trouble along this line?—C. E. B., Michigan.

Reply: By way of comment on your report, it may be said that your dosage of calcium gluconate is considerably less than half that recommended by Prof. Greig, who discovered that milk fever is due to a hypocalcemia and originated the calcium treatment for it.

Specifically, Prof. Greig recommends that one ounce of calcium gluconate be injected intravenously for its immediate effect and one ounce be injected subcutaneously to guard against a relapse. Practically, however, practitioners are finding the subcutaneous injection all that is necessary, and give the whole dose, two ounces, in this way. In fact, the Bovetts and Stinson, who are among the earliest and most extensive users of the calcium treatment for milk fever and who have reported a considerable number of cases, give doses of two to four ounces subcutaneously.

Calcium chloride, which is more commonly used in this country than the gluconate, needs to be given in doses of but half this size, since calcium chloride contains twice as much calcium as does the gluconate, and it is the calcium that is the active part, the acid radicle probably being inert in both salts.

There are two generally recognized objections to the use of udder inflation as a treatment of milk fever: (1) The suspension of milk secretion for a varying period following this treatment, and as a consequence, a loss of production; and (2) the very general practice of dairymen undertaking this method of treatment themselves, a practice that is frequently followed by infection of the udder and dire results.

The intravenous injection of calcium chloride has three drawbacks: (1) The inconvenience of injecting a solution intravenously, which requires a careful technique, that the solution be warmed to blood temperature and filtered if it contains any sediment whatsoever; (2) A 10% solution of this salt is very irritant and unless all the solution is deposited within the blood stream, abscesses and sloughing result; (3) Theoretically, since milk secretion is resumed immediately, the animal is liable to a relapse unless she is supplied a reserve of calcium upon which to draw. Practically, however, this seems not to have occurred where the initial dose was adequate.

The calcium gluconate, if given intravenously, is subject to the same objection as the chloride in No. 1 above, but since it is non-irritant, the danger mentioned in No. 2 above is avoided by its use, and by giving a subcutaneous injection the possibility of an early relapse

from a second depletion of calcium is avoided.

In practice, however, calcium gluconate is coming to be used only subcutaneously and even used in this manner, recovery seems to be prompt, as prompt as with its intravenous use.

Cases of parturient paresis occurring weeks or months after parturition and cases occurring, as they sometimes do, during the non-lactating period, although apparently due to a hypocalcemia, cannot be explained on the same theory that explains cases occurring just after calving, that is to a depletion of the calcium in the blood by the sudden demand of colostrum and milk production. Care to supply a regimen furnishing an abundance of calcium would seem about all that can be prescribed in the light of our present knowledge to prevent these atyphical cases.

As a prevention of parturient paresis for the critical 72 hours following calving, Professor Greig recommends the subcutaneous injection of two ounces of calcium gluconate at the time of calving, and a repetition of the dose 24 hours later, with perhaps a third dose after another 24 hours in very highly susceptible animals.

Calcium gluconate given subcutaneously in this dosage causes a rise in the calcium content of the blood for a period of 20 hours, but given intravenously the excess calcium is promptly eliminated by the kidneys and the lower bowel.

As is well known, there is an empirical method of prevention of milk fever that has been practiced by many dairymen for years. It consists in milking only small quantities from the udder during the first 72 hours after calving, and leaving the udder distended during this period. This practice is effective but frequently results in a material lowering of milk production subsequently, and thus defeats the purpose for which the dairyman keeps the cow.

Prof. Greig was able to maintain a high level of calcium in the blood by daily administration *per os* of vitamin D (viosterol) for a period of about a week. Following that, the calcium level fell even though the administration of viosterol was continued. In this connection, the experience of the Wisconsin Station in administering cod liver oil for its vitamin D content to cows should not be overlooked. The cod liver oil decreased the butter fat production 20% or more. No records are given to indicate whether or not viosterol also reduced the butter fat.

In any case, the hypodermic injection of calcium gluconate would appear to be the more practical method for the prevention of milk fever at calving time in cows highly susceptible to this disease.

Giving even the calcium gluconate solution subcutaneously is a matter requiring care. It is available in 10 per cent sterile solution in ampules and the use of these ampules is the simplest way of giving it, but the cost can, of course, be lowered if the veterinarian will buy the powder, or rather the granules and make his own solution.

A manufacturer of the gluconate granules gives the following directions for preparing the solution:

"The necessary quantity of powder is dissolved in boiling water. In order to obtain perfect solution a 5 per cent solution is best.

"When the solution appears to be clear, it is very carefully filtered.

"The filtrate is then boiled for 20 or 30 minutes, allowed to cool to blood heat, and then injected.

"If the solution is boiled in an open vessel, allowance must be made for the water evaporated."

Blampied, in a recent issue of the *Veterinary Record*, has the following to say concerning a solution so made:

"I followed these recommendations by using a 5 per cent solution and boiling for about two minutes, but did not filter.

"I have since treated twelve cases of milk fever by subcutaneous injections only. They all made uneventful recoveries. In a few cases the area surrounding the point of the injection remained tender for about 24 hours."

Happenings at the U. S. Live Stock Sanitary Association Meeting

The 34th annual meeting of this association of state veterinarians, live stock commissioners, officials of the Bureau of Animal Industry and the Health of Animals Branch of the Canadian Department of Agriculture, veterinarians and others interested in live stock sanitation, was held at Chicago, December 3-5, 1930.

A. E. Wight, chief of the Tuberculosis Eradication Division of the U. S. Bureau of Animal Industry, president, in his opening address reviewed briefly the live stock sanitary situation in various parts of the country, and the progress made in certain animal disease control projects that have been under way for a number of years. Referring first to:

Tick Eradication

The audience, at the opening session which exceeded 300 in number, was reminded that this association owed its organization to the necessity for control of tick fever in cattle and that the success of this vast project, the ultimate freeing of continental United States from every fever tick, can now, after 25 years of effort, be said to be in view.

The tick eradication forces were congratulated upon the splendid progress made during the year and the large amount of territory (66 counties) released from the tick fever quarantine. It was pointed out, however, that the work still to be done was greater than the area still under quarantine would indicate, since "the last tick is far harder to get than the first one or any of the others." It is pointed out that the remaining counties in the quarantine area were located in marshes, breaks and semi-arid range districts where the difficulties in finding and dipping cattle were enormous.

However, the losses to considerable areas from the cattle tick totals a very large amount and amply justifies even greater efforts in the future to hasten the desirable day when a tick quarantine will no longer be needed for any part of the United States.

Parasites

The speaker stressed the economic importance of animal parasites and urged that this association take steps to formulate a systematic plan for the eradication of internal and external parasites of animals.

Tuberculosis Eradication

The speaker pointed out that the bovine tuberculosis eradication project was a child of this association, that in it the plan had been formulated and modified and improved from year to year as the large experience of the members of the association had dictated, and that without the support of those comprising this association, it could not have succeeded.

Poultry Diseases

The president stressed the importance of poultry diseases and urged that this association give them more attention, and particularly that it give careful thought to the matter of avian tuberculosis, the economic importance of which was not recognized until recently and was not given adequate consideration when the measures which have brought about gratifying progress in the control of bovine tuberculosis, were formulated.

Interstate Shipment

The president reviewed at some length the great benefits that have accrued from the uniform regulations for interstate shipment, that have been devised in this association and promulgated from it. It was claimed that in the past these regulations had operated effectively to prevent the spread of animal disease in the shipment of breeding stock, but that a new problem now confronts the live stock industry and live stock sanitary

officials, in the matter of control of interstate shipment.

The new problem has been brought about by the very large movement of animals by truck. Such movements had already resulted in the spread of disease because the machinery of sanitary control had not been made to fit the present conditions. It was urged that the matter be taken up in the proper committee of this association, and predicted that it would be solved as successfully as the

A. E. Wight
President United States Live Stock Sanitary Association.

problem of movement of live stock interstate by rail had been solved in the past.

Bang's Disease

The speaker expressed it as his belief that Bang's Disease is now responsible for a greater loss among live stock than any other disease. He said that for almost a decade this association had devoted a large part of its time to the discussion of this disease, and had annually reported through its committee on abortion disease, the progress that had been made in its study and control.

He stated that it could be definitely said that control measures that are effective have been worked out. These measures might not be adaptable to universal application, but that while further study of the disease was being pushed, they could be used at least under certain conditions to the very great advantage of the live stock industry. The number of abortion-free herds and the much greater number of herds in which the elimination of abortion had been undertaken, is evidence of the willingness of the farmers to accept any sound plan of control.

Milk and Meat Hygiene

The United States has a very effective plan for the inspection of meat for interstate shipment and milk for import, according to Doctor Wight. No country in the world can be said to have further advanced in safeguarding its meat and milk supply so far as this inspection extended, but it is a regrettable fact that the inspection is not all inclusive, and there is yet much meat slaughtered for local consumption without any sort of sanitary control, and a considerable quantity where the inspection service is inadequate. This is a matter that comes definitely within the province of this association, and the speaker stated, he would like to see it take up and handle the inspection of meat now excluded from the federal inspection, in the same vigorous and effective manner that it handled tuberculosis eradication, fever tick eradication, foot-and-mouth disease, hog cholera and other live stock sanitary problems.

Clearing House for Disease Information

The president again brought up a matter that has been before the association for more than a decade, that of establishing a central bureau for the dissemination of information on the prevalence of infectious diseases.

He stated that the annual meetings of the association acted as an exchange, a clearing house for such information, but that yearly reports were too infrequent to be of the greatest advantage, that a weekly or monthly exchange of this information would be valuable to the live stock industry.

RESEARCHES ON INFECTIOUS ABORTION

In discussing the investigation of Bang's disease, W. E. Cotton, superintendent of the Bureau of Animal Industry, Experiment Station, Bethesda, Maryland, stressed the fact that infectious abortion is an exceedingly difficult and expensive disease to investigate, that many inoculations must be made and innumerable bacteriological examinations carried out to go even a very short way in the investigation of the disease.

He stated that Doctor Schroeder had outlined a plan for the investigation of this disease before this association nine years ago, and that investigation had been continuous ever since and that in addition to the work being done by the Bureau of Animal Industry at Bethesda, there were now 13 projects carried on cooperatively by the Federal Department of Agriculture and as many state institutions.

Transmission Experiments

Most of these projects will require several years to complete, but some things have already been discovered. For example, that infection with this disease occurs even more readily by conjunctival inoculation than it does by ingestion or by hypodermic injection. Two to four drops of a suspension of a virulent culture placed in the conjunctival sac rarely fails to infect; infection by this method having occurred in 16 out of 17 trials.

The importance of this mode of infection in nature is not known, but it is easily inferred that infection might occur in this way from splashing of vaginal discharges, dust, flies, etc.

It is also discovered that guinea pigs are readily infected through the unbroken skin. Cattle, however, are not so readily infected in this way. Four out of seven pregnant heifers were infected by rubbing a culture containing the organisms on the unbroken skin. The importance of this mode of infection in nature is not known, but it may be inferred that caked manure and encrusted vaginal discharges on the skin of animals may be a means of infecting them.

Some cases of infection of cattle by the swine strain of brucella organisms have been found. The way in which such animals became infected with the swine strain of organisms is not known, but it is suspected that such infections have been due to the use of live organisms in

C. P. Fitch
President of the 11th Annual Conference of Official Research Workers of North America.

vaccine, one vaccine having been found on the market that was made of the swine strains of organisms. The swine strain, however, does not infect cattle as readily as does the bovine strain. Three pregnant heifers were exposed to infection by the swine strain by the conjunctival methold. One was infected and aborted. One did not become infected and delivered a live calf. The other, in addition to being inoculated in the conjunctiva also received a hypodermic injection of organisms, and this one delivered a live calf, but reacted to the agglutination test. It is thus seen that while 16 of 17 animals inoculated by the conjunctival method with the bovine strain were infected, only one of three

so inoculated by the swine strain was definitely infected and aborted. The bovine strain in turn is but slightly infectious for swine.

Vaccination

Vaccination for the prevention of infectious abortion is objected to by many, but it cannot be disregarded lightly. Segregation and the elimination of the infection is preferable to vaccination where it can be used, but it is not always practical. Vaccination has given results almost ideal in some instances. In others, the failure of vaccination has been almost complete.

There is a wide variation in the vaccines obtainable on the market. Some are capable of conveying and have conveyed the disease. Others have failed to produce immunity. Because a virulent strain of organisms in a vaccine will sometimes set up infection in the udder and the failure of vaccines made from organisms of low virulence, to afford sufficient protection to the vaccinated animal, an effort has been made to obtain strains of medium virulence for use in a vaccine, but success in this has not yet been attained.

Other Methods of Control

Chemo-therapy has been widely investigated and has given no encouragement.

There seems little doubt that segregation, sanitation and elimination of the infection is the plan to follow in the majority of instances. In some instances, however, it is equally apparent that it is not a feasible, practical or perhaps even a possible plan.

Some experience with herds in which abortion was due to causes other than the Bang organism have been noted. In one herd of 200 dairy animals under investigation over a period of nine years after the elimination of the Bang organism, a high abortion rate has continued, varying from 6% to 13% and for one three-year period remaining above 9%.

UNDULANT FEVER FROM A PHYSICIAN'S VIEWPOINT

Richard A. Kern, University of Pennsylvania, Philadelphia, discussed the history of undulant fever, stating that it had been recognized on the Mediterranean littoral for a matter of 200 years, and judging from the works of early medical writers, had probably occurred throughout recorded history.

The first cases due to the Brucella abortus was described by Kiefer in 1924. The public health section of the League of Nations has recently described undulant fever as the most important public health problem of today.

Three strains of this organism, the caprine, bovine and swine strain are interpathogenic for goats, cattle, swine and man. The greatest danger to man from the disease occurs to those who handle it in the laboratory. Of six public health workers with the organism, five have contracted the disease in this country. Raw milk is the most important source of undulant fever in man. Not a single proved case has ever been transmitted by pasteurized milk. Young children, and young animals, certainly young calves possess a rather high degree of immunity to the disease. Over 90% of all the cases that have been recognized, have occurred in people living in the country or in small towns.

Fever is the only universal symptom, but there is nothing characteristic about the fever. It may be high, and continuous or low and intermittent. The attack may last as short a period as two days or as long as three or four years, and possibly longer. The second most common symptom is drenching sweats and a third common symptom is pain in the joints. In 10% of the cases a rash develops. The mildest cases are practically symptomless. The disease offers great difficulties in clinical diagnosis.

The mortality is between 1% and 2%.

Individual prophylaxis consists in the avoidance of contact with infected animals and carcasses and avoidance of the use of raw milk or butter or cheese

made from unheated milk. Prophylaxis from a public health point requires the elimination of infectious abortion of cattle and swine. Doctor Kern believes the attack on Bang's disease will need to be as vigorous, as sustained and as extensive as the attack now being made on tuberculosis of animals.

BLOOD TESTING FOR ABORTION BY THE PRACTITIONER

Walter Wisnicky, Division of Live Stock Sanitation, Wisconsin Department of Agriculture and Markets, Madison, stated that less than three years ago, the State Department of Agriculture and Markets, in cooperation with the university, undertook a project for the control of contagious abortion at the demand of the cattle owners of the state.

In preparing this plan, they had appropriated all of the information supplied by the research workers the world over, but one thing that they had contributed to the plan, he believed was original.

The loss in Wisconsin from contagious abortion exceeds $10,000,000 annually. The use of biologics in the control of that disease in that state, have been a liability, but gratifying results have followed the use of their plan, which is based on isolation and sanitation, and the use of the blood test.

The work is handled in Wisconsin entirely by the practitioners. The practitioner draws the blood, makes the test, with the rapid agglutination method, interprets the test, directs the segregation of infected and non-infected animals, and superintends the sanitation on the farm. His work is carried out under the direction of the Department of Agriculture; a representative of the department visiting the practitioner from time to time to inspect his work. The work is checked further by the Department of Veterinary Science at the university, to which the practitioner must send on call, duplicate specimens of blood drawn and a record of the interpretation of his own test.

This part of the plan, putting the work exclusively in the hands of the veterinary practitioner under the supervision of the state department, the speaker believes is an original contribution from his state to the control of the disease. The advantages of the plan over drawing the blood and sending it to a laboratory are manifold. No disadvantages have as yet been discovered.

Perhaps the greatest advantage of all is that it fixes the responsibility absolutely and the state departments and the dairy owner know the man to blame if results are not what they should be.

It is also more economical than other methods and of course, is more convenient. The rapid agglutination test for contagious abortion, the speaker regards as bearing the same relation to the control and eradication of that disease as the intradermic tuberculin test bears to the control and eradication of tuberculosis. The eradication of neither disease is practical without these particular tests. In the use of the test, in Wisconsin, they have found that practitioners acquire skill and become thoroughly expert in making and interpreting the rapid agglutination test somewhat more readily than they do in making and interpreting the intradermic tuberculin test. However, carrying out the sanitary regulations have been more difficult for the practitioners in the control of contagious abortion than they are in area tuberculin testing. So, on the whole, it can be said that one test is as easy and as accurate when given by the practitioner, as the other and is as readily learned.

Before a practitioner is approved for this work, he must demonstrate his ability at the university by making and interpreting tests and by such questioning and examination as the Department of Veterinary Science at the university thinks necessary.

About 240 veterinary practitioners in Wisconsin have already been approved for this work and are carrying out the

work in a highly satisfactory manner.

The attitude of the live stock owners has been surprisingly favorable to having the work handled by local veterinarians. They much prefer it to having the work done by state men with whom they are not acquainted.

AGGLUTINATION TESTS OF LIVE STOCK ASSOCIATED WITH CASES OF UNDULANT FEVER

Charles Murray, Department of Veterinary Investigation, Iowa State College, Ames, reported on cooperative work undertaken with the U. S. Public Health Service in the investigation of the importance of the brucella organisms as a public health problem.

In the beginning, the veterinarians on the investigation were somewhat convinced that infectious abortion in cattle and swine played a very minor role in the cause of undulant fever in man. The public health investigators, on the other hand, were convinced that it was the principal source of undulant fever in man and a very distinct public health hazard. Since the investigation, there is an agreement of both parties on a middle ground.

Contagious abortion was found in 18% of the herds on farms where there was no undulant fever and in more than 60% of the herds on farms where undulant fever had occurred in the farmer's family. Abortion infection in sows was found on 4% of the farms where no undulant fever occurred, and on 23% of the farms where undulant fever had occurred. These figures are suggestive at least that the animals were the source of infection in man. On the other hand, on 29% of the farms where undulant fever occurred in the farmer's family, there was no abortion infection in either the cattle or swine. This is very suggestive that there are other than animal sources of undulant fever infection in man. Since the disease is known rarely to spread from man to man, a problem of investigation is still open.

GLEANINGS FROM THE PROGRAM ON ABORTION PRESENTED AT THE INTERNATIONAL VETERINARY CONGRESS

J. W. Connaway, Department of Veterinary Science, University of Missouri, Columbia, made a report on the discussions of infectious abortion at the International Veterinary Congress at London, last summer. This report comprises in the main the abstracts of the papers on Bang disease at the London Congress, which have been published in VETERINARY MEDICINE, October, 1930; pages 417-425 inclusive. It was clear that Doctor Connaway regards the paper presented by W. E. Cotton, U. S. Bureau of Animal Industry Experiment Station at Bethesda, Maryland, as being the best contribution to the discussions at the International Congress. This paper will be published in this magazine next month. It is a very valuable summary of present information on the subject.

CONTAGIOUS ABORTION

In the role of umpire, F. B. Hadley, Department of Veterinary Science, University of Wisconsin, Madison, Chairman of the committee on abortion, summed up the progress made in the control of the disease during the year, stating that this association had been interested in this subject for many years, and during a considerable part of that period, had probably devoted more time to its discussion than to any other subject, save tuberculosis and hog cholera.

He stated that the agglutination test for the detection of the disease stands higher in the regard of the live stock sanitarians than ever before, that it has been demonstrated that the blood test, segregation and sanitation is an effective means for combatting the disease and will bring it under control.

Effective measures for the control of Bang disease depends solely upon the prevention of exposure to infection, and the ultimate elimination of the infection. Eighteen states require a certificate show-

ing freedom from the disease for the importation of dairy or breeding stock, and eleven other states prohibit the importation of known infected animals.

Knowledge of the importance of infectious abortion as a public health problem is vague at the present time and not likely to be different in the immediate future. These facts, however, may be said to be established: Brucella organisms of both the bovine and the swine strains are pathogenic for man; both strains are found in persons suffering from undulant fever; the sources from which the infection in man is obtained are not definitely known; some cases are due to contact with infected animals; some are due to consumption of raw milk from infected cows; the source of infection in other cases has not been determined.

It is important to the live stock industry that larger appropriations be made for research into Bang's disease. The disease is a particularly difficult and expensive one to investigate and one in which the investigations consume much time.

The committee recommended that the official name of the disease be changed from "infectious abortion" to "Bang's disease" and the recommendation was adopted.

THE IMPORTANCE OF STANDARDIZED ANTIGEN

N. S. Mayo, Highland Park, Illinois, stated that it is most unfortunate that there is no official standard for the antigen used in making the agglutination test for Bang's disease; that the antigens on the market vary considerably, and related an incident of an experienced practitioner who recently told him that if he were selling an animal, he would use "So and So's" antigen, but if he were buying an animal, he would use another firm's.

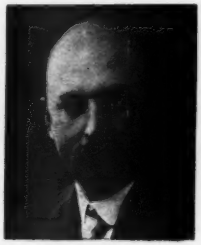
The speaker expressed it as his conviction that a standardized antigen for the detection of abortion is just as important as a standardized tuberculin for making the tuberculin test.

PUBLIC HEALTH ASPECTS OF BANG'S DISEASE OF MINOR IMPORTANCE

A. T. Kinsley, of Kansas City, stated that he thought we were stressing too much the importance of Bang's disease as a public health factor; that the cases of the disease reported in this country yearly equal only about 1 in 50,000 population; and that if we admitted that only one-half of the cases of undulant fever were diagnosed, the ratio was still 1 in 25,000, and the mortality of the disease is only about 1%. In other words only about one death per year for each 2,000,000 of the population.

As a contrast, he pointed out that in Kansas City 1 in 5,000 are killed each year by automobiles, and yet no one talks of eliminating the automobile because of this. He stated that some of the states now enforce unwise regulations restricting the movement of cattle thus laying a heavy tax on the live stock industry and affording no protection against the disease, citing, for example, a regulation requiring heifer calves to

Mayo



Mohler

Kinsley

Eichhorn

These Well-Known Veterinarians Took Part in the Meeting

pass a negative agglutination test for abortion disease when it is perfectly well known that such animals do not carry the disease, rarely if ever become infected through natural exposure and promptly recover from artificial inoculation.

A Failure in State Control

He said also that it had come to his attention in two instances recently where abortion free animals shipped out of the Kansas City Stock Yards had suffered heavily from infectious abortion after reaching their destinations, and that an investigation had shown that these animals had been placed in infected herds.

He said that no live stock sanitary official was performing his full duty to the live stock industry when he permitted such things to occur without advising the purchaser of the cattle of the almost certain disaster that would come upon him from such practice. He said the records accompanying the cattle showed definitely where they were going, and he regarded the live stock sanitary official as remiss who did not inform the purchaser that he was getting abortion free animals and if he placed them with infected cattle that they were almost sure to contract the disease and suffer heavily from it.

MY EXPERIENCE WITH HOG CHOLERA

I. K. Atherton, inspector in charge of hog cholera control, State of Maryland, College Park, Maryland, is well known for his championship of sanitation as a means of controlling hog cholera; for his use of serum alone in infected herds, and for his views that the simultaneous vaccination has a very restricted application in the control of hog cholera.

In his paper dealing with his experiences in the control of hog cholera in Maryland, he elaborated on the foregoing, and cited instances to support his contentions.

In 1878, two veterinarians, James Law and H. J. Detmers, began a series of investigations of hog cholera under the direction of the U. S. Commissioner of Agriculture. Doctor Atherton regards the report of these gentlemen as being a valuable contribution even now to the information on hog cholera and a credit to the veterinary profession of that day.

He quoted from Doctor Detmer's report as follows:

"A radical extermination is the only thing that will be effective, unless it can be proved that a spontaneous development is taking place, or can take place, within the borders of the United States. No authenticated case of a spontaneous development of hog cholera has yet come to my knowledge, and the disease, I am more convinced than ever, can be stamped out. But the measures of extermination or stamping out must be thorough. Anything undecided, doubting, hesitating, or wavering and favoring, will be of no avail, but will only tend to prolong the existence of the plague and increase the cost."

Instead of taking the advice of Doctor Detmers in attempting to eradicate the disease, steps were early taken to learn how we could live with the disease, and in time the discovery of anti-hog cholera serum and virus that enables us to do this—live with the disease—without serious interference with the swine industry, but at a great expense.

When, in 1908, it was announced that hog cholera could be prevented by the use of simultaneous vaccination, the erroneous belief was generally accepted that any one could double treat swine and immunize them against cholera for life, and thus sanitary measures were unnecessary. For this reason, the wonderful advantages in the discovery of anti-hog cholera serum and virus were largely lost.

Sanitary measures were abandoned, bars against disease were lowered, the danger of spreading the infection was ignored and practices responsible for starting new outbreaks and maintaining centers of infection were recommended and practiced.

To substantiate his contention that vaccination for the prevention of cholera is not a means of eradication of the disease, the

speaker gave the following quotation from Dr. Marion Dorset:

"I think we will have to recognize that we cannot expect to eradicate hog cholera by the use of serum or by vaccination. This is not an agency to be used for that purpose; it is not to be used to eradicate it, but to control the losses from it. That is the particular function, as I see it, of anti-hog cholera serum, to control the losses from the disease."

Doctor Atherton stated that his own experience showed conclusively that vaccination was to prevent losses from hog cholera and not the spread of infection; that common experience showed us that no disease could be controlled or eradicated without stopping the dissemination of the causative agent; and, therefore, hog cholera can neither be controlled nor eradicated by vaccination.

He voiced an emphatic protest against the oft-repeated statement that "immunization is the only known means of preventing hog cholera." He contended that the control of hog cholera is more or less a problem of farm management, and when this is recognized, it will be better for all concerned. He stated that when a farmer's hogs contracted cholera, it is, in most instances, his own fault and there was no excuse for permitting the spread of the infection from his premises. He stated that nothing is farther from the truth than to say "hog cholera is spreading" in a given locality. The statement should be that "the swine owners are spreading hog cholera infection" in a given locality.

When an outbreak of hog cholera occurs, it is due to some agency that could have been controlled. Practically all animals that contract cholera acquire the disease from having ingested the infection with food or water or through a virus needle. In support of his contention, he gave the following quotation from O. E. Dyson, then president of this Association (1916):

"The greatest problem now confronting swine breeders throughout the United States is whether or not the contagion of hog cholera can be controlled. The mere fact that annual visitations of hog cholera, with its attending losses have heretofore been looked upon by the average breeder as being inevitable, should by no means be permitted to establish the mistaken belief that the contagion of hog cholera would fail to yield to modern sanitary control, the application of which would limit the movement of cholera infected swine, require the cleaning and disinfection of infected premises, railway cars, loading pens, chutes, etc. There is no more reason for permitting the unrestricted spread of the contagion of hog cholera from infected herds or premises than to ignore the fact that hog cholera is an infectious disease."

The real crux of the problem of hog cholera control is new centers of infection. Without them we would have no secondary outbreaks of the disease. It is generally accepted that the infected hog is the most sure transmitter of the disease. In some localities this is the most important source of the infection. Possibly everyone present can remember instances of clinically ill hogs being

Cahill

Shore

Lockhart

Wilson

Listeners: Drs. E. A. Cahill, H. J. Shore, Ashe Lockhart and R. H. Wilson, took no part in the discussions, but no one knew any more about what was going on. Nothing escaped them.

shipped for slaughter. It has long been and still is a common practice to market exposed hogs—that is, hogs in the incubative stage of hog cholera—and the practice of shipping out feeder hogs from the central markets after vaccination is well nigh universal. Of course, every such animal shipped out from central markets is exposed to cholera before he is vaccinated.

The speaker sent a questionnaire to 700 veterinarians in the middle western states, asking, among other things, the cause of new outbreaks of hog cholera. The answers indicated that 44% of all new outbreaks was due to the introduction of infected hogs.

In Maryland only 6% of the new outbreaks are due to the introduction of infected hogs. The speaker believes that adequately imposed sanitary regulations will reduce outbreaks from the cause in any territory to approximately the Maryland rate.

The questionnaire referred to above showed that 16% of all the new outbreaks in the middle western states were caused by infected pork scraps fed to swine in slops or garbage. The writer believes that this estimate is far too low. He regrets that a greater effort has not been made to collect such information. His investigations in Maryland have led him to believe that more than 90% of the outbreaks of hog cholera in that state is the result of feeding infected pork scraps to hogs.

The speaker believes that one of the first essentials in the reduction in the losses from hog cholera is to prevent the movement interstate or intrastate of swine that have originated in infected herds or on infected premises. There might have been a time when shipping infected swine to market could be justified, but now with anti-hog cholera serum there is no need for doing it. Prompt recourse to vaccination will reduce the losses to a point to where the marketing of animals in the incubative stages of the disease to say nothing of those clinically ill, cannot be justified on any grounds.

The speaker knows of no biologic products that are generally misused as is anti-hog cholera serum and virus. Even when the virus is judiciously used, an occasional hog dies and when ignorance or carelessness are the dominating factors behind the syringe, dire results must inevitably follow. It is only when virus is improperly used that it spreads new centers of infection and yet hardly a day passes but this thing occurs. The questionnaire referred to in the foregoing showed that next to the infected hog, the improper use of virus was the most important factor in causing outbreaks of disease, in fact was responsible for 40% of such new outbreaks. Farmer vaccination was the main source of the trouble. Another source by no means negligible was the administration of the double treatment to hogs in no condition to receive it.

The farmer is not to blame for farmer vaccination and the unfortunate results that follow it. In the first place, we gave him to understand that vaccination is the only means whereby hog cholera can be controlled. Next he was impressed with the view that virus is a safe thing for the children to play with, and following that tons of literature have been broadcast on how to inject serum and virus into the hog, with little or no mention of the dangers of the treatment. The speaker has in his office, 47 official bulletins from the U. S. Department of Agriculture and from state agricultural experiment stations on the subject for the use of laymen and everyone of them written by veterinarians. If the farmer has been misled into the belief that he can safely vaccinate his own hogs, and in thousands of instances he has been so misled, it was veterinarians that misled him.

In the last 14 years, a number of "new diseases" of swine have become prevalent in the corn belt states. Some of these the speaker has been informed are proving a greater menace than hog cholera. They are frequently spoken of as filth borne diseases. The speaker does not regard this as an accurate description of the diseases. They do not have them in

Maryland and yet he believes that that state can show as filthy hog lots as any to be found anywhere.

The speaker blames the use of virus for reducing the resistance of the hog to a point where otherwise harmless organisms become pathogenic and take a heavy toll in disease. Experience has shown that there is practically no danger in administering the double treatment to healthy swine, but the case is otherwise in the animals whose vitality has been lowered. It is 97 years since hog cholera first attracted attention in this country and yet "hog cholera remains a death stalker without rival in the live stock industry."

The achievements in the prevention of cholera have been anything but creditable to the veterinary profession. Our course is plain and our duty imperative to familiarize the live stock raiser with the means by which cholera infection is spread and to take more radical action to prevent the introduction and wholesale spread of the infection, and control the use of immunizing virus, according to Doctor Atherton.

SWINE DISEASE PREVALENCE

In the report of the Committee on Swine Diseases, by F. H. Brown, State Veterinarian, Indianapolis, Indiana, it was stated that there had been no material change in the swine disease situation during the year. In drought stricken areas, infectious diseases had been somewhat less prevalent among hogs, but the drought appeared not to have affected the prevalence of parasites.

In view of the economic importance of parasites of swine the committee recommended that the Bureau of Animal Industry and various state researches on this subject be continued and extended, and that in addition, each state employ at least one competent man to investigate the prevalence of animal parasitisms in those states, compile statistics and furnish information necessary for planning control projects.

Infectious Abortion of Swine

Infectious abortion of swine is attracting far more attention than formerly. It is of considerable economic interest, but public health aspects of the disease are responsible for most of the attention now being centered upon it.

Hog Cholera

Hog cholera continues to be the most destructive disease of swine. It has been somewhat less prevalent than last year. There has been less vaccination done for its prevention and the percentage of breaks following vaccination have been

Hoskins

Koen

Dr. H. Preston Hoskins, the efficient secretary of the A. V. M. A., is much in evidence and always working at his job.
Dr. John S. Koen is always willing to make a speech if called upon, and lurks in likely places for speech making.

less than last year. The committee urges upon veterinarians to use the greatest possible care in vaccination for the prophylaxis of hog cholera, to make certain that a sufficient quantity of virus and of serum is used, that the swine are in a condition to be vaccinated, properly to store serum and virus and to make sure they use no out-dated products.

They further recommend that state officials check up, where practical, on serum and virus distributors to see that the serum and virus they are supplying are not outdated.

They recommend that research as to the means of dissemination of cholera be continued and extended and that the effect of other diseases on the production of immunity be given further attention and that the effect of feed on the production and duration of immunity receive

further investigation. They recommend that the shipping of infected swine for slaughter be discouraged and that vigorous prosecution of the shipper be instituted wherever shipments of hogs visibly sick with cholera are received at public markets.

The committee recommended also state supervision of garbage feeding plants and that farmers be encouraged to raise their own feeders and where the necessity for shipment of feeders prevailed, that the shipments be made as short as possible and that the public stock yards with inadequate facilities for the proper handling of swine be avoided.

They recommend that the simultaneous immunization of swine be practiced only by qualified and responsible veterinarians, that the vaccination of young pigs be encouraged. It stated forcefully that the day is past when we could safely vaccinate a herd when in doubt. He urged veterinarians to use all possible care in the use of serum and virus and to make at all times, a reasonable charge for their services.

PARASITIC DISEASES

A. T. Kinsley of Kansas City, Chairman of the Committee on Parasitic Diseases, stated that it was unnecessary to add much to the splendid reports that had been made by previous committees of the association.

Progress during the year included a definite demonstration that bot infestation in horses can be controlled by the administration of carbon disulphid at the proper time.

Definite progress had been made during the year in fever tick and scab eradication. The McLean system of raising swine was extending. Anaplasmosis had been transmitted, during the year, by the brown dog tick. Other insect carriers may exist, but at least it is definitely known that this one conveyed the anaplasma marginale from infected to non-infected cattle.

The Committee urged a greater caution in the use of parasiticides, reminding those present that a parasiticide is a poison not only for the parasite but for the host, and it is only because of the host's greater tolerance to the poison that it can be used to destroy the parasite.

He emphasized that with some parasiticides the margin between the amount that would destroy the parasite and not kill the animal, and the amount that would kill both the parasite and the animal was a narrow one, and that careful dosage should be employed and good judgment exercised in selecting animals in a condition to withstand the parasiticide without undue harm.

PARASITES AND THE FIELD OF VETERINARY SERVICE

E. M. Nighbert, for a number of years in charge of the Bureau of Animal Industry investigation of kidney worms and liver flukes in swine with headquarters at Moultrie, Georgia, but recently transferred to Washington, was called upon for a few remarks, and stated that something near 20 years ago, the veterinary profession suddenly found that it must extend its services and that equine practice no longer comprised its sole or in many instances, its most important service. Small animal diseases, dairy diseases, swine diseases and poultry diseases, in turn demanded a share of his time and effort, and a decade ago, it was supposed that with the inclusion of practically all domestic animals, the veterinarian's field would not be further extended. But, recent years have shown that the successful veterinarian must be an even more versatile person and that the veterinary profession, if it is to render the service it should, must take over a whole group of ailments to which it had hitherto given but little attention—parasitisms in all of these animals—and in addition, it must be prepared to serve the fur industry, which already includes foxes, mink, muskrat, martens, badgers, raccoons and some other animals and is he believes, destined to very considerable

extension as the wild sources of fur disappear and fur must be produced under semi-domestication. That with the transition from wild life to semi-domestication we do not know just how important infectious diseases are in the fur industry, but it has already been demonstrated that parasites and parasitic infestations are of tremendous importance to the owners of these animals and that they must have skilled veterinary service for the profitable production of fur.

He stated that parasitism in domestic animals is known to be on the increase; that animal parasites are known to be increasing and extending all over the country; that animal parasites have been spread throughout the country by the transportation of animals and were still being so spread and yet there is not a single restriction on the interstate shipment of animals infested with internal parasites.

He believed that the unrestricted transportation of parasitized animals from state to state is as illogical and as costly as the unrestricted interstate transportation of animals suffering from infectious diseases.

He stated that his investigation at Moultrie, Georgia, had shown that the loss in hogs in that district from kidney worms alone amounted to 30 cents per hog, and he had reason to believe that the same condition extended throughout the southern third of the country; that at the one little packing house at Moultrie, the losses were in excess of $80,000 per year.

The condition is not difficult of control. Experiments made for the control of kidney worms in swine by sanitation has reduced their prevalence 97%.

He spoke of the importance of anaplasmosis in cattle, a disease that exists in some of the southern states, and in states in the central west. Recent investigations have shown that it is spread by the brown dog tick. Perhaps there are other vectors but this at least is one. Brown dog ticks were being carried all over the country by dogs in automobiles. Without any restrictions, brown dog ticks were being disseminated to every state and perhaps to every country.

The difficulty of eradicating ticks in an era in which they are once established has been shown by the more than 20 years and millions upon millions of dollars it has taken to eradicate the fever tick from eleven southern states. The hazard that anaplasmosis may be to the cattle industry of the country is not known, but certainly we are preparing the field for widespread devastation from it, if it turns out to be that kind of a disease.

E. M. Nighbert

"PAUL POTTER'S BULL"

In discussing live stock sanitary methods as observed by himself in Great Britain during the past summer, J. W. Connaway of Columbia, Missouri, stated that the veterinary profession of the British Isles is amply able to undertake the control and eradication of live stock diseases in a manner as effectively as control measures are handled in this country and that the English system of animal husbandry in many instances, is more favorable for instituting control measures than the American. He believes that the chief reason why animal disease control has not been undertaken and handled successfully in Great Britain as it has in this country, is because the live stock owners have a wrong psychology. They are convinced that it cannot be done and therefore cannot be induced to support measures for doing it.

He cited particularly the conditions in the Channel Isles as being such as to make the control of infectious abortion of cattle indeed very simple. The animals are constantly tethered even when grazing and segregation, therefore, affords no difficulty whatever.

DISTRIBUTION OF THE AVIAN TUBERCLE BACILLI AMONG MAMMALS

L. Van Es, Department of Animal Pathology, University of Nebraska, Lincoln, reported on the completion of the experiment undertaken by the Nebraska station in 1923 to ascertain the prevalence and importance of avian tuberculosis in man and domestic animals, including poultry, the means by which it is transmitted and methods of its control. Ad interim reports

L. Van Es
Proof of every statement is required before it can be accepted.

on this work have been made yearly and have been published as made, in the pages of this magazine.

To summarize the conclusions, tuberculosis in swine is preponderantly of the avian type and there is a large loss from this disease in swine. Other domestic animals, including horses, cattle and dogs, are occasionally infected. The loss from the disease in these animals is unimportant. Occasionally, cases of avian tuberculosis infection in man have been reported in Europe, but the disease can scarcely be called a menace to human health; nor can infected poultry meat be considered a human health hazard of importance.

Of one lot of 105 infected birds (1 pigeon, 2 turkeys, 103 chickens) from various localities, 104 were infected with the avian type and one with a mixture of avian and mammalian strains. The investigation throughout indicated that this is probably about the average, and it would seem safe to assume that at least 99% of tuberculosis of poultry is of the avian type.

Lesions were examined from 58 cases of generalized tuberculosis in cattle and all yielded the bovine strain. Lymphatic glands from 39 "no lesion" cases in cattle were examined with negative findings in all instances. Skin lesions from 40 reacting cattle were examined and in 36 acid fast bacilli were found. All 40 were free of living tuberculosis bacilli. Pigs were fed skin lesions from reactors and subsequently did not react either to bovine or avian tuberculosis. None of them showed lesions of tuberculosis on autopsy.

Lesions from 115 (not generalized) cases in cattle were examined and 12% of them found to contain organisms of the avian type. Lesions from 227 cases of human tuberculosis were examined. Only 8 of these were generalized cases; 44 were bone and joint cases; 99 were cases of kidney infection; 25 were cases of tuberculous lymph nodes; 13 were cases of infected spinal fluid; 11 were tuberculosis abscesses; 27 were cases having miscellaneous lesions. Of these 217 were found to be due to the human strain, 9 to the bovine strain, one to a mammalian strain, and none to the avian strain.

Occasional cases of generalized tuberculosis in swine due to the avian strain were found, but in general the avian type leads to but local lesions, and does not result in the condemnation of the whole carcass at slaughter.

From previous observations and from the observations of others, the speaker has been led to believe that there has been in recent years, a very considerable decline in the prevalence of tuberculosis in man due to the bovine organism. Of the nine cases due to the bovine organism

found in the 227 cases of human tuberculosis, six were in cases of renal infection and all but two were from persons in middle life, which inclines one to believe that the educational campaign carried on, the wide use of pasteurized milk and the great decrease in bovine tuberculosis due to the progress of the eradication project, has resulted in fewer children being infected with this organism than formerly. He thinks the cases that he found in adult life were due to infection contracted before the control measures now widely observed were instituted.

It was obvious from this investigation that in methods for the suppression of tuberculosis in man, human sources of infection must continue to receive primary attention.

NEWER ASPECTS OF THE PREVENTION OF TUBERCULOSIS

J. A. Myers, President, Minnesota Public Health Association and Associate Professor of Preventive Medicine, University of Minnesota, Minneapolis, stated the geographical distribution of tuberculosis is a very interesting thing, as is also the source of the organism. It is very closely related to an acid fast organism that occurs on the grass frequently called timothy bacillus.

Because tuberculosis did not occur in tropical Africa or the South Sea Islands when civilized man first went there, it was assumed that there was something in those climates that prevented its occurrence and that if persons affected with the disease would go to those climates they would recover. Even so recently as the time of Robert Louis Stevenson, it was believed that by going to the South Sea Islands one would recover from the disease and as all remember, Stevenson went to the South Sea Islands for this purpose.

And again, because tuberculosis was not found among the American Indians when white man came to this country, it was assumed the Indian's immunity to the disease was due to the fact that he lived in the open, and the open-air treatment of tuberculosis received much publicity and for a time, became a fad. The disastrous effect of tuberculosis among primitive peoples in South Africa and the South Sea Islands and among American Indians once the germ was introduced by civilized man, effectively dispelled these illusions and demonstrated that all that was necessary for tuberculosis in those localities was the introduction of the organism.

C. A. Cary
He broke a 30-year record at this meeting by not making a speech.

Tuberculosis affects mammals, birds and reptiles. A different type of organism has developed for each of these classes of animal life. Although it has but recently spread to very considerable sections of the earth's surface, such as South Africa, the South Sea Islands, North and South America, it has existed elsewhere for a great period of time. As far back as history goes, we find the disease described, and mummies taken from the ancient graves in Egypt contained lesions of the disease. Rivers, mountains and seas used to be barriers to its spread. Modern means of transportation has broken down these barriers and the disease is now of world wide occurrence.

It was one time believed to be an inherited disease and although there is not in all medical literature a single indication to be found that the disease was ever inherited, the popular belief that it is a heritable disease still obtains.

The veterinary profession has been far ahead of the medical profession in the diagnosis and handling of tuberculosis. Although it was only in 1888 that Koch announced his discovery of tuberculin, in 1891 we find a Russian veterinarian testing cattle for the detection of tuberculosis.

In 1891 an American veterinarian (Leonard Pearson) brought tuberculin to Pennsylvania and in the following year, began testing cattle with it. We hear in medical circles, a great deal about the importance of the early diagnosis of tuberculosis, and the Anti-Tuberculosis Association, lays great stress on this and campaigns of education for tuberculosis control are pretty much based upon it, but the term as used by the medical profession is an absolute misnomer. It is veterinarians who practice and have practiced since 1891, the early diagnosis of tuberculosis. The early diagnosis of this disease depends upon the use of tuberculin. The diagnosis made after the disease has progressed to a stage where it can be recognized by clinical symptoms or where lesions in the lung can be revealed by the X-Ray is no longer early and the greatest opportunity not only for the treatment of the individual infected, but for the prevention of the dissemination of the infection has been lost.

Great progress has been made in the control of tuberculosis in man. This is revealed not alone by statistics, but by common every day experience and observance all about us. There are fewer hunchbacks than there used to be. Those pitiful cases of hip disease and tuberculosis of the knees, from which so many children suffered within the memory of all of us, are much fewer at present. Cases of gland tuberculosis and bone tuberculosis, the types largely due to the bovine organism are becoming so rare in Minnesota that it is with the greatest difficulty we are able to find sufficient clinical material to demonstrate to our student nurses and medical students at the University of Minnesota.

Bovine tuberculosis as a public health problem is rapidly decreasing in importance in this country, but we must not rest upon the partial victory that we have won. The bacilli of tuberculosis is wily and lurks in unseen places. It will come back on the slightest opportunity. The experience of Germany before and after the war is a warning to all. Before the war, the decrease of tuberculosis in Germany and its low incidence among the people of that nation was the boast of its scientists, but during the war public health measures were relaxed, tuberculous persons that had been segregated in public institutions were allowed to mix with the general population; live stock sanitary measures for its control were suspended; and at the end of the war, Germany had the highest mortality rate from tuberculosis that had ever existed in the history of the nation.

In 1915 a great physician was asked why not apply the tuberculin test to all children and he answered that it is useless for the simple reason that all of them are known to be infected and their reaction to the tuberculin test would not add to our information on the subject. It is not so today. Recently a number of surveys have been made, a method borrowed directly from the veterinarian's area testing, and the results have astonished public health workers. The first came from St. Louis where it was reported that less than 50% of the boys and girls had reacted to the tuberculin test. Public health workers and physicians everywhere were either incredulous or offered various explanations for the result. Then came a survey by Slater in Minnesota showing less than 10% infection; and two more in Boston from two different localities, one showing less than 10% infection and the other more than

90% infection, and public health workers all over the country suddenly awoke to the fact that wide spread pasteurization of milk, the removal of tubercular cows from supplying raw milk, the segregation of serious cases of human tuberculosis in hospitals, education in the matter of cleanliness and improved economic status had cut down the sources of infection until the children of this country are no longer exposed to anything like the infection that they formerly were.

Tuberculosis, however, still exists in veritable nests. If public health workers will do as veterinarians have done, do area testing, they will locate these nests. They can be located in other ways, but area testing is the simple profitable way of locating them. For example, one high school I have in mind has an enrollment of only 80, and yet in five years, 14 of the students in that school have broken down with tuberculosis. In that community a nest of tuberculosis infection exists. It should be located and eradicated.

The veterinarian calls every case of infection, a case of disease. Physicians will have made an important advance in their understanding of the disease when they too call every case of infection as revealed by the tuberculin test a case of tuberculosis, instead of as now, referring only to those that have developed observable symptoms as cases requiring their attention.

C. H. Hays, Lincoln, Nebraska, in discussing the paper of Doctor Myers, agreed that by area testing only can the sources of tuberculosis infection be discovered, and made a plea that the work of area testing be not let fall into routine methods, stating that instances had occurred in which live stock owners in a locality were aroused to the desirability of a test, interested in it and favorable to it, but after the first test had been made, they assumed a false sense of security and interest lessened and observance of the regulations for the prevention of reintroduction of infection had suffered, and that this was a dangerous attitude. The live stock owner's interest in the project must be kept up until it is finished, his cooperation is essential to its success and his cooperation is dependent upon his interest.

AVIAN TUBERCULOSIS

H. D. Chamberlain, Department of Agriculture, Springfield, Illinois, in discussing the handling of avian tuberculosis in Illinois,

DeVine

Welch

Dr. John F. DeVine, a former president of the Association, has missed but one meeting in 21 years.
Dr. W. H. Welch, State Veterinarian of Illinois, is a new member of the regulatory forces and therefore of the Executive Committee of the U. S. L. S. A.

stated that a great deal of tuberculin testing of chickens had been done, that those engaged in the work realized that it was of doubtful practical value as a method of eradicating tuberculosis in chickens, but the matter had been continued in an effort to find out the extent of this disease in the poultry flocks of the state.

During the past year the plan had been followed of testing the flocks on from 20 to 30 farms in each county, and that when a test was made on a farm all of the fowl, both young and old, were tested with avian tuberculin and all of the swine were tested with both avian and bovine tuberculin. He stated that from experience, they found it much better to employ local veterinarians to do the work than to send state employes to do it; that the state men could not persuade the farmer to test his flock in any expenditure of time that could be considered economical but that local men, because they had the confidence of the men they were doing the work for, can readily induce selected farmers to undertake the eradication project on their farms.

In this test as carried out during the past

year, somewhat more than 100,000 fowl were tested. The tuberculosis rate has been found very high, and among the swine on farms where there was tuberculosis in poultry, the avian type of the disease was preponderant among the swine. In many herds, it was the only type of the disease that existed.

INFECTIOUS BRONCHITIS OF BABY CHICKS

C. P. Fitch, University of Minnesota, in discussing the general subject of poultry diseases, stated that tracheitis or infectious bronchitis or by whatever name that acute respiratory disease is known, is the most important disease of young chicks in Minnesota, not excepting pullorum disease, and that cognizance of it must be taken in control measures if the poultry industry was to avoid disastrous losses.

He stated that in Minnesota during the past year, they had tested more than 100,000 birds for pullorum disease, but in doing this they had barely scratched the surface of the problem; that a control of the disease by means of an agglutination test must inevitably prove enormously expensive; and a disease control project of the greatest magnitude.

AVIAN TUBERCULOSIS SPREAD BY POULTRY SHOWS

J. W. Connaway of Columbia, Missouri, stated that live stock sanitary control authorities have been remiss in permitting avian tuberculosis to spread as it has; that for a long time the disease existed only along our northern border and it is only within very recent years that it had occurred at all in Missouri and when it first did occur in that state, it was only in counties bordering on Iowa.

He stated that in the middle west and north central states, the spread of avian tuberculosis was from fairs and poultry shows to which diseased birds were brought without restriction and distributed without hindrance and that control measures to stop the further spread of avian tuberculosis were already long over due and should be instituted at once.

TUBERCULOSIS ERADICATION

A. E. Wight, Chief, Tuberculosis Eradication Division, U. S. Bureau of Animal Industry, Washington, D. C., reported on the progress of the campaign for the eradication of tuberculosis, and stated that greater progress had been made in the last twelve months than at any period since the work began in 1918.

During the year, Michigan was added to the list of states in which all counties are modified accredited areas, that is in which the incidence of tuberculosis among cattle is less than 0.5%.

The fifth bi-ennial report on the amount of tuberculosis in cattle was made in May 1930, and showed an incidence of only 1.7% all over the whole country. In 1928, the incidence was 2%, and in 1922, when the first survey was made, it was 4%. In only a little over 100 counties is there more than 7% infection in the cattle. There was a slight reduction in the number of free accredited herds. This is accounted for by the fact that when counties in which accredited herds are located become modified accredited areas, some owners of accredited herds do not see the need of continuing their herds on an accredited basis.

Two hundred twenty-eight counties were added to the modified accredited area in the past year. In those counties, 4,160,000 cattle were tested. Testing for reaccreditation in 185 counties showed an incidence of disease of only 0.34%. No county required to be removed from the modified accredited area as a result of retesting.

Tuberculin testing for interstate shipment decreased as compared with the preceding year, 120,000 fewer animals being retested for this purpose. This is explained in part by the business depression, lower prices and therefore less trade in cattle and in part by the fact that much of the demand for tuberculosis free animals for replacements can now be supplied from within the state, where the demand occurs.

Naturally, with the price of cows

lower, the salvage to owners decreased markedly during the past year, and the average contribution from federal funds decreased from $46 in 1929 to $26 in 1930. The average appraisal of reactors was $30 less in 1930 than in the preceding year.

The decrease in the condemnation of carcasses or parts of carcasses of cattle for tuberculosis at packing houses where federal inspection is maintained represents an annual saving of $3,500,000 from the loss due to this source in 1924. This is by no means all of the saving. It should be remembered until the tuberculosis eradication project was well under way, that the amount of tuberculosis in cattle was continually increasing and had this work not been undertaken, by this time the loss would have been far greater than in 1924.

Johne's disease was recognized in 15 different states. It is not widespread or making much headway. Only 400 carcasses have been condemned for this disease in three years. Neither Johnin or avian tuberculin have proved entirely satisfactory as a diagnostic agent for this disease.

Avian tuberculosis is confined largely to the middle western and north central states. The good results that have attended efforts at its control and eradication fully justify larger appropriations for this purpose.

COMMITTEE ON TICK ERADICATION

Dr. N. F. Williams, State Veterinarian, Fort Worth, Texas, reporting on tick fever eradication, stated that approximately 25,000 square miles in four states, and including all of the remaining quarantined counties in Mississippi, had been released from the tick quarantine during the year; that of 15 states originally quarantined, 11 had now been released. Counties release during 1930 totaled 66, and since the fever tick eradication began, 783 counties have been released from quarantine.

UNIFORM REGULATIONS

Wm. Moore, State Veterinarian, Raleigh, North Carolina, gave an interesting report of the Committee on Uniform Regulations. He pointed out again as has been repeatedly pointed out in this Association before that state quarantine regulations for animals shipped interstate are invalid and without effect, that no one can be forced to comply with them. Under the clause of the U. S. Constitution giving the Congress authority over interstate commerce, Congress has delegated to the Secretary of Agriculture authority to proclaim quarantines on interstate shipment and state regulations requiring for example the abortion test for cattle imported into a state, or a pullorum disease test of chickens shipped interstate are not worth the paper on which they are written, and are observed only as long as the livestock sanitary authorities can get away with it and they get away with it only so long as shippers are either ignorant of the true status of affairs or do not consider the matter of enough importance to contest it in the courts.

It was pointed out that conditions in the various states make it exceedingly desirable that the live stock sanitary authorities of those states be given authority to institute regulations governing importation of animals for the protection of their live stock industry.

This Association has repeatedly endeavored to procure such legislation from the Congress and twice the Senate has passed a joint resolution granting this authority to the states, but in each instance it has failed in the House of Representatives. The Association will continue its efforts to secure this legislation from the present Congress.

W. J. Butler, State Veterinarian, Helena, Montana, Chairman of the Special Committee on Legislation, gave a brief account of the efforts his committee had made to procure the passage by the Congress of legislation referred to in the foregoing. He stated that Senator T. J. Walsh of Montana had introduced a resolution in the Senate on the request of the Committee and had procured its passage there; but that when the

resolution reached the House, it was strongly opposed by the poultry interests, who maintain an expensive lobby in Washington, and was first amended so as to be unsatisfactory to the Committee and then allowed to die with the adjournment of Congress without having reached a vote.

Chickens Come Home to Roost

The fate of the resolution to permit live stock sanitary authorities to regulate the shipment of live stock into their states for the protection of the live stock industry of those states, should act as a warning to live stock sanitary officials to be reasonable in the regulations they issue. The opposition of the poultry industry to the legislation desired by this Association permitting state regulation for the prevention of the introduction of animal diseases into the state, was directly due to what they termed "unreasonable restrictions" imposed on the movement of poultry during 1926, at the time of the outbreak of European Fowl Pest in this country, and the writer believes that it is generally admitted by live stock authorities that regulations issued at that time were unreasonable. The same may be said of certain regulations issued by states on the occasion of foot-and-mouth disease outbreaks in this country. That single mistake has cost the Association a lot of effort, has placed live stock authorities in an embarrassing position in attempting to protect the live stock industry in their states from diseased animals, has made the enforcement of their regulations dependent upon the support of public sentiment and is likely to lead to more disaster.

The lesson apparently has not been fully learned. Eighteen states have recently enacted regulations requiring female dairy and breeder cattle shipped into those states to be accompanied by certificates certifying the animals to be free from abortion disease, and eleven more states have taken the attitude that if the shipper knows his cows or heifers are affected by Bang's disease, they cannot be shipped into those states, but if he doesn't know whether or not they are infected, it is quite all right. This peculiar regulation, if it means anything, means that the shipper should not know too much. It is unreasonable to bar one diseased cow because she has reacted to the agglutination test and admit another equally diseased cow, that has not been tested.

In addition to being illegal, some of the 18 states have made their regulations unreasonable. We refer to the requirement that female calves be free from infectious abortion as shown by the agglutination test before they can be shipped into the state, when it is well known that a calf is no more likely to carry the infection into that state than a bale of hay or any other object that may be contaminated with the organisms.

MILK AND MEAT HYGIENE

Dr. W. G. Hollingsworth, Utica, New York, in making the report of the Committee on Milk and Meat Hygiene, said that 8,000,000 people are taken ill daily in this country; that 275,000,000 days are lost from work annually due to sickness; that no one knows, and few suspect, to what extent this illness is due to unwholesome food; that there is a great need for veterinary service to certify to the wholesomeness of the food supply of the country; that no health department can be 100% efficient without a veterinarian in it; that the health of children in a community is judged largely by the quality and quantity of milk they consume.

THE NEW PRESIDENT

J. W. Connaway of Columbia, Missouri, was elected president; E. T. Faulder, Albany, New York, first vice-president; W. K. Lewis, Columbia, South Carolina, second vice-president, and Edward Records, Reno, Nevada, third vice-president.

Doctor Connaway has been a member of this association since its organization 34 years ago; has been a regular attendant at its meetings, and has contributed largely to the program of practically every meeting.

His selection to head the Association for the coming year is not only a recognition of his high standing as a live stock sanitarian, but a fitting acknowledgment of the great service he has rendered the Association throughout its history.

A CASE OF IDIOCY IN A BULL

A roan bull, aged about 18 months, weight 600 to 700 pounds, was brought to the packing house for slaughter.

The history was meager, the animal could not be driven to the plant, so was brought in a wagon built to carry cripples.

The animal had been handled roughly and was very warm and much excited. It could stand all right and walk if not disturbed. Any attempt to drive or lead it caused it to fall down or stagger against anything in its way. If left alone, it was quiet and made no effort to escape or resist being examined.

The poll was protruded as if suffering from an abscess or enlargement from dehorning and yet it did not exhibit any pain or soreness of the head. The eyes had a vacant stare like that of a new born calf and it acted much as a new born calf acts when handled.

The temperature was abnormally high at first, apparently from the rough handling it had received. In about three hours the temperature had lowered decidedly and in five hours was still lower. The animal was resting quietly but still had the stupid look and action.

The next morning or 18 hours after I first saw the animal the temperature was practically normal, respiration normal. The stupid look still was very apparent and led the observer to suspect a case of subnormal brain or what in the human is imbecility. Certain actions exhibited and the inability to co-ordinate the nervous and muscular structures tended to confirm this impression.

The animal was killed and no lesions appeared on inspection of the cervical glands or the cervical region. The skull was opened in the usual manner of removing the brain. The skull exhibited unusual thickness of the bones and excessive enlargements of the frontal sinuses which were reinforced with an unusual number of partitions or compartments which did not show any evidence of inflammatory process, but were nearly three times as thick as normal before reaching the cranial cavity proper. The condition was undoubtedly congenital.

The cranial cavity proper was only about one-half the usual size and contained many ridges to correspond to the involutions of the brain, which was only one-half or less the normal size of a brain of an animal of the size of this one.

The usual number of convolutions of the brain were present but were much smaller and harder to the touch than is the normal brain, and of a yellowish color similar to nerve structure. The brain did not have the plump pliable feel that a normal brain has, indicating that but a small amount of gray matter was present. This led to a diagnosis of congenital malformation or subnormal development of the brain except the cerebellum and medulla oblongata, which appeared normal. The spinal cord also appeared normal.

As such cases in animals usually die shortly after birth from inability to care for themselves, or are destroyed as being worthless, this case is of special interest.

After examination of the brain and cranial cavity and the form of the cranial bones, the imbecility and muscular incoordination was explainable.

W. Ross Cooper.

Kansas City, Mo.

GINGER PARALYSIS

Some weeks ago there were many reports of "Jake paralysis" in various parts of the South and Southwest. Altogether tens of thousands of cases were reported.

A very thorough investigation undertaken by the U. S. Public Health Service determined the affliction to be a multiple peripheral neuritis due to phenol poisoning, specifically to a contamination of an alcoholic preparation of Jamaica ginger with tri-ortho cresyl phosphate.

The "Jake" was imbibed for beverage purposes and it is thought that the phenol contamination was probably accidental and in any case, was added to the "Jake" manufactured over only a short period.

EXAMINATION FOR ACCREDITED VETERINARIAN

Please publish the questions used in recent examinations for position of accredited veterinarian, and give the answers.—L. L., Illinois.

Reply: It is contrary to the policy of VETERINARY MEDICINE to publish approved answers of recent civil service examinations. As an indication, however, of the scope of the examination for accredited veterinarian, the following questions are given, which are substantially those used in a recent examination for this position:

1. Define: a. Necrosis; b. morphology; c. pyemia; d. emaciation; e. tubercle.

2. Tell how you would make the following combination of tuberculin tests: a. subcutaneous and intradermal; b. intradermal and ophthalmic.

3. You are called upon to certify for interstate shipment 20 cows that have been accredited for ten months. What action would you take?

4. You are requested by the owner of an accredited herd to make an annual retest. What would you do?

5. Give a plan for the eradication of tuberculosis in swine in a township where 15% of the animals marketed show slight tuberculosis infection.

6. a. What animals are used to differentiate between the human and the bovine type of tubercle bacillus? b. What are the indications of each type.

7. a. What means would you use to avoid the spread of contagious abortion in area tuberculin testing? b. What is the likelihod of the spread of contagious abortion by area tuberculin testing as now conducted?

8. Why do tuberculosis lesions sometimes remain localized in an animal for years?

9. You are called upon to test a herd of 20 cows for interstate shipment. In the test you have 5 reactors and 2 give suspicious reactions. a. What do you do with the reactors and suspicious cases? b. What would you do with those that pass a negative test?

10. Give a plan for the eradication of avian tuberculosis from a township in which 50% of the flocks are infected and in which the infection averages 10% in the infected flocks.

COLON TWIST AND CYSTIC OVARY

An interesting case was that of a draught mare (aged) which quite suddenly exhibited symptoms of violent colicky pains, which a rectal examination proved to be caused by a very decided twist in the floating colon. I found it impossible to define or to shake loose after some two hours of strenuous effort per rectum. Owing to the age and unsoundness of the patient, a laparotomy was not acceded to and the patient was destroyed and posted.

The twist was found to be caused by the colon being wrapped around the mesovarium, which was rope-like in form, one inch in diameter and eight inches in length, and suspended a large cystic ovary weighing three and one-quarter pounds, the colon being wrapped around the ligament one and one-half times and quite taut. The condition was probably not improved by the shaking and mauling it was subjected to during my efforts to untwist or dislodge it.

The enlarged mass of the ovary could not be felt through the rectum or the vagina, and the actual cause of the twist was quite unsuspected.

It is of interest to note that no sign of abnormal estrum or undue sexual irritation was ever noticed in this animal at any time in her life.—H. H. Hodgson, Stamford Centre, Ont.

The consumption of milk in New York City is 1,000,000 quarts less per week now than it was a year ago. The business depression and the fact that large numbers are unemployed, is believed to be the reason for the decrease.

More than one-third of all the counties in the United States are now practically free from bovine tuberculosis. On October 1, 1930, there were 1,035 counties classified as "modified accredited areas"—areas in which tuberculosis had been reduced to not more than 0.5 per cent of the cattle population. Twenty-four counties were added to the modified accredited area in September. These counties were located in nine states and included a total of 432,163 cattle. Twelve of the counties were in Ohio where very rapid progress recently has been made in the campaign, of tuberculosis eradication.

PSITTACOSIS OF BIRDS AND MAN

Five outbreaks of psittacosis have occurred in the United States. The outbreak of 1929-30, however, seems to have been the most important one. The Public Health Service have a record of 74 foci of infection, which gave rise to 169 cases with 33 deaths from November 24, 1929 to May 7, 1930. These cases do not include 16 laboratory cases with two deaths, nor 12 cases removed from merchant ships entering our ports.

The disease is highly communicable from birds (parrots, parakeets, etc.), to man. It is much less easily communicated from bird to bird. Instances of infection from man to man are rare if they occur at all, which is doubtful.

The prevention of psittacosis in man is simple. It consists of the avoidance of contact with tropical birds.

PITFALLS IN OBSTETRICS

In order to help the young man over the rough spots, I will recite a couple of my errors made when I was old enough to know better. Perhaps some one else won't be misled as I was, and will conclude the examination before dismissing the case.

The first was a call to remove a retained placenta. It was a simple case, and accomplished easily, so without making any further examination, I left. Later I learned that this cow had given birth to twins and I had removed only one placenta, leaving the other one to nature.

The next time I made a similar mistake, I was called to a severe case of dystocia, found the cow flat on her side, prolapsed vagina and after considerable effort, replacing swollen parts, succeeded in removing the calf, or rather a calf.

I never thought there might be twins. The cow got up and it seemed best to let her alone to allow the swollen parts to subside.

Later I learned that a second calf commenced to show, a few hours later. The owner *did not send for me.* He worked three or four hours and the cow died.

Moral: Never leave this kind of cases until the uterus has been examined.—W. V. P., New York.

SUPER-MILKING MACHINE

Roto-Lactor is the name given to a rotary milking combine that has been built and installed at the Walker-Gordon Laboratories Company of Plainsboro, New Jersey, a division of the Borden Company.

The contrivance consists of a rotating platform containing 50 stalls, equipped with milking machines, milk-weighing apparatus and facilities for washing cows. The platform turns slowly, requiring twelve and one-half minutes for one revolution, and in this time the cow's udder is washed, dried and she is milked.

By running continuously, the machine will milk 1,920 cows three times in 24 hours. The cow is driven onto the machine, makes a complete circle in twelve and one-half minutes and is driven back to her barn.

It cost $200,000 to build the first one, but it is believed that they might be produced in quantity for $50,000 each, and at that rate would prove a profitable investment since it requires but two men to operate it, or six men working two in each of three eight hour shifts.

The Walker - Gordon Laboratories Company milks 3,500 cows, 1,600 of which are kept at Plainsboro, New Jersey.

The Dale-Lehbach bill, which became a law at the session of Congress ending last spring, increased substantially the retired pay of government civil service employes. The government's contribution to the annuity paid a B. A. I. veterinarian retired after 30 years service is, under the new law, $1200. The annuities paid employes retiring with less than 30 years' service is proportionately less.

According to H. Morris of the Louisiana Station, a limited number of fly transmission experiments seem to indicate that the infection (of anaplasmosis) may be transmitted from a diseased animal to a susceptible animal through the interrupted feeding of the large black horsefly *Tabanus atratus*.—Exp. Sta. Vol. 63, No. 4.

Anaplasmosis of cattle has been transmitted experimentally from infected to healthy animals by means of the brown dog tick, *Rhipicephalus sanguineus,* according to Rees of the U. S. Department of Agriculture, who is in charge of zoological investigations at the New Iberia Experiment Station, Jeanerette, La. Ticks were allowed to engorge as larvae on an animal known to be affected with anaplasmosis, and when the nymphs were placed on susceptible animals the disease was transmitted. The experiments were conducted under closely controlled conditions in a specially built barn. All stalls were inclosed with fine-mesh screen to exclude flying insects, and the barn was surrounded with a moat of crude oil to exclude crawling forms of life that might affect the results.

Investigators believe that the cattle-fever tick is partly responsible for spreading anaplasmosis, but since the disease occurs also in tick-free areas it is evident that other carriers are involved in its spread. It has been shown that under experimental conditions the brown dog tick is capable of transmitting this disease.

CASES OF CHRONIC NEPHRITIS IN HORSES

About a year ago my brother in Iowa, a physician, wrote me about his mare, a saddle-bred animal about 15 years old. He said she was "crampy" and often required much urging to make her get up after lying down. She had shown this condition in some degree for several years. After getting started, she usually warmed out of it in a little time, but of late was getting so she had to be helped up some times. She would try several times and then quit trying until helped.

My brother asked my advice. I told him I thought chronic septic nephritis was the trouble and advised him to have the mare destroyed, as at her age and the apparent chronic nature of the condition treatment would do no good. She became so much worse that he had her destroyed before my letter reached him.

About two months ago one of the packing companies had a horse that was either cast in the stall or had a sudden severe attack of symptoms that I suggested was probably nephritis.

There was the marked stiffness of hind quarters, disinclination to move; for a week or so a poor appetite and, I think, less than the usual amount of urine was passed.

The horse gradually regained part of his appetite, but never recovered the proper use of the hind quarters. Much of the stiffness persisted, the flanks were somewhat tucked up, and he fell off some in flesh. A veterinary practitioner was called but made no diagnosis. So, a week or more later, the animal was sent to the country for a long rest. The horse is 11 years old and weighed 1,750 pounds before becoming sick.

The barn boss told me he had noticed the horse was a little crampy in turning and in certain movements for a considerable time before the marked attack. It looks to me like an old chronic case of nephritis with a recurring acute attack.

W. Ross Cooper.

Kansas City, Mo.